DOCUMENT RESUME

ED 178 101 IR 007 891

AUTHOR	Caruso, Elaine
TITLE	TRAINER: Computer Assisted Learning and Practice for Users of DIALOG/ORBIT. Final Report.
INSTITUTION	Pittsburgh Univ., Pa.
SPONS AGENCY	National Science Foundation, Washington, D.C.
PUB DATE	Aug 79
GRANT	DSI-77-26525
NOTE	201p.; For related documents, see IR 007 892-893 ; Best copy available
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	*Autoinstructional Programs; Bibliographic Citations; Computer Assisted Instruction; *Evaluation; Information Dissemination; *Information Retrieval; *On Line Systems; Program Development; Programed Instruction; Programed Texts; Public Relations; Search Strategies; *Use Studies

ABSTRACT

Trainee development, TRAINER programs, and dissemination strategies are treated in this summary of the TRAINER computer assisted learning program for scientists and other professionals who wish to do literature searches using online services. A discussion of TRAINER's rationale, design, constraints, and differing institutional implementations gives an overview of the program. Statistical tables summarize online use of the TRAINER tutorials from February through May 1979. Four individual histories are then reviewed in detail, in terms of capabilities demonstrated and strategies used to retrieve target documents. The second part of the report discusses programming languages used to develop tutorial models, emulator design, and structure of the TRAINER database. Reviewed in the third part are dissemination efforts made in two areas: to create public awareness through library and information science professionals, and to encourage use of TRAINER by institutions so that more individuals could use the training modules. Awareness was maximized through newsletters, journal articles, and conference papers, which are listed, along with project personnel. (SW)

****

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

****

ED178101

TRAINER

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

COMPUTER
ASSISTED
LEARNING
AND
PRACTICE
FOR
USERS
OF

BEST COPY AVAILABLE

Dialog®

ORBIT
A World of Information

Lockheed Missiles & Space Co., Inc.
Code 5020/201
3251 Hanover Street
Palo Alto, CA 94304

2500 Colorado Avenue
Santa Monica, CA 90406
(213) 829-7511

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Elaine Caruso

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Final Report
Work Completed Feb. 1978-May 1979
NSF Grant No. DSI [illegible]7-26525
Principal Investigator, Elaine Caruso
August 1979

IR007891

National Science Foundation

Grant No. DSI 77-26525

TRAINING MODULES
FOR USERS OF
SCIENTIFIC AND TECHNICAL INFORMATION SERVICES

Report of Work Completed

March 1, 1978 - May 30, 1979

Submitted by

Elaine Caruso

August 1979

Contents

List of Appendices and Exhibits 2
Abstract 3

Part I TRAINER

Rationale for TRAINER 5
Design of TRAINER 9
Design Constraints 17
Differing Institutional Implementations 19
How TRAINER is Used 23
Trainee Perseverance (Muskingum) 27
TRAINER Use at Pittsburgh 33
    Table 23 Users, Feb. - May 1979 39
Case by Case Statistics of Use 41
    Case 1 46
        Table of Capabilities Demonstrated 50
    Case 2 55
        Table of Capabilities Demonstrated 60
    Case 3 66
        Table of Capabilities Demonstrated 68
    Case 4 74
        Table of Capabilities Demonstrated 75

Part II TRAINER Programs

Conceptual Overview 83
Tutorial Modules 85
Emulator Design 89
TRAINER Database 94

Part III Dissemination

Activities 105
Analysis of Public Response 108
Publications on TRAINER 111
Papers and Presentations on TRAINER 113

Publications Referenced 115
Project Personnel 117

Appendices

1. User Histories (Feb. - May 1979)
2. Assessment of TRAINER Tutorials (R. K. Nicholas)
3. CATALYST Primer for TRAINER Implementation
4. Documentation for CATRAN Users
5. Load and Deposit Byte Subroutines
6. PIRETS

Exhibits Accompanying this Report

1.	TRAINER^{TM} Manual: Computer Assisted Learning for Users of DIALOG^{TM} and ORBIT^{TM}	72 p.
2.	MiniManual for Users of TRAINER	8 p.
3.	Pocket Reference Guide for Users of TRAINER, DIALOG^{TM} and ORBIT^{TM}	6 faces
4.	TRAINER: A Textual Representation of the Online Experience. Section A: DIALOG^{TM}	81 p.
5.	________. Section B: ORBIT^{TM}	88 p.
6.	Presentation Package for TRAINER	60 p.

Abstract of Final Technical Report
NSF Grant No. DSI 77-26525

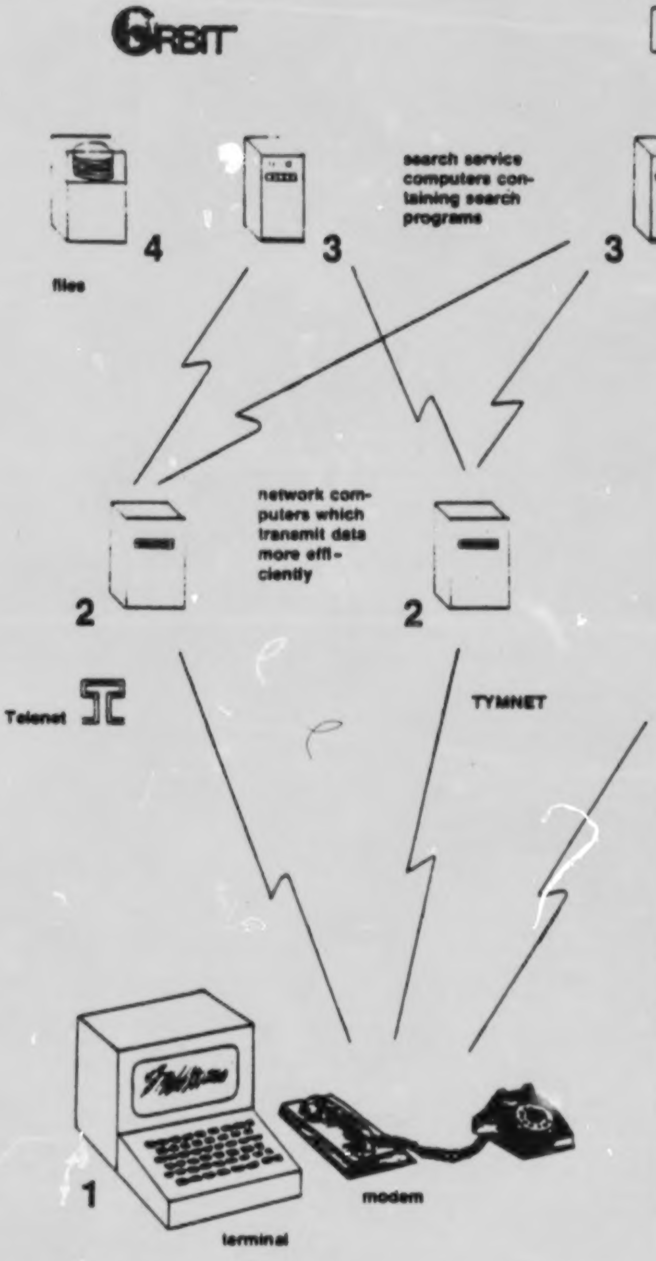
TRAINING MODULES FOR USERS OF SCIENTIFIC AND TECHNICAL INFORMATION SERVICES

TRAINER is a computer assisted learning program, for scientists and other professionals, who wish to do some or all of their own literature search and reviewing, using online services. The programs, which include tutorial modules and emulations of DIALOG^{TM} and ORBIT^{TM}, are described: (1) as a learning environment, with descriptions of the achievement of the final test population of 15 chemist users; and (2) as computer programs designed on a DEC-10, for transportability to other computers (main frame and mini) with descriptions of sibling implementations in several other computing systems.

A trainee will spend approximately 5 hours with the online programs to achieve a level of online searching competence sufficient to complete a search: using telecommunications networks; logging into the search service; requesting a specific file; entering search vocabulary as subject descriptor, title word, or author name; using index browsing techniques and universal character options; creating a logical statement; requesting on-or off-line printouts in various formats. Strategies for optimizing search performance as appropriate to beginning users are emphasized.

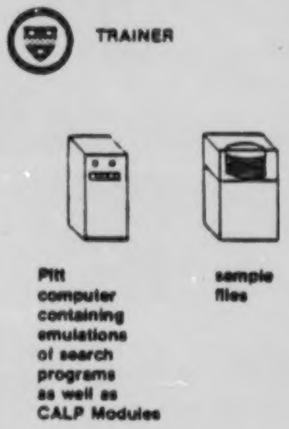
The programs are written in FORTRAN IV; they occupy about 600K bytes of direct access online storage; a database of 2 searchable files of 2M bytes each is recommended as a minimum for practice searching using the two emulators. Tapes consisting of all programs and NTIS and ERIC file segments have been prepared for distribution to DEC-10, PDP-11, and IBM type users who want to implement the system.

TRAINER
for


ORBIT
Dialog
4
files
3
search service computers containing search programs
3
4
files
network computers which transmit data more efficiently
2
2
Telenet
TYMNET
1
terminal
modem

Searching the online data bases involves:

1. you at a terminal;
2. via telecommunication network;
3. issuing COMMANDS to a retrieval program;
4. which executes your COMMANDS to search the various online files.


TRAINER
Pitt computer containing emulations of search programs as well as CALP Modules
sample files

TRAINER is a training version of the online world.

You can learn about both networks and the COMMANDS of both search services.

You can practice the online procedures in the responsive, protected environment which TRAINER provides.

The Rationale for the TRAINER

The notion embodied in the TRAINER Project is this:

Some individuals who use the professional literature of their fields will prefer to use the online search services themselves, for at least some of their searching.

The goal of the TRAINER Project is:

To make appropriate training available for those individuals, the end-users, to make such freedom of individual access a realistic possibility.

Our testing of TRAINER in an environment of end-users leads us to believe that our notion is correct, and that TRAINER is indeed a useful means of training such users.

There are many arguments which can be used in support of the desirability of the option for literature users to do their own searching. These arguments can be categorized: economic, intellectual, or social. In the economics class: while the case is often made for the mediated search, as more quickly and cheaply done than the search by the literature user, this argument neglects the costs of housing and paying the intermediary, and of inconvenience and time of the user who must locate and go to the place where service is offered. Davis McCarn calls this the

> "...Catch-22 for the information community. Powerful systems allow access to increasing amounts of information but only through intermediaries with whom users are reluctant to interact... Is there any sense to our present course of replacing [indexes and card catalogs] with systems which, though automated, are more labor intensive and require an intermediary?*

To continue the economic aspect of the argument we can point to the study done by Winifred Sewell and Alice Bevan which indicates that total use of the online system tripled when users accessed the system for themselves.** Surely a tripling of the market would result in lowered costs per use. Would it also generate an intensive effort to make the systems more usable to attract a larger market that could result in even larger sales and lower costs?

Intellectual arguments can be made at several levels. Considering the actual value of completed searches at one level: users who are not present or actually running searches cannot apply their subject expertise to the selection process nor invoke their own understanding of their need in the subsequent development of the search statement. What they get is a fast "batch" search, which tends to be too much, too little, or not quite on target. At another level we need to consider the estrangement of the professional from the literature of his field, when we put him at a distance from the newest most effective tool for working with that literature. Part of the traditional competence of a specialist is his knowledge of and effectiveness in using the record of research and progress in his field; and further we have evidence from a study by Thomas J. Allen that the most productive scientists and engineers prefer to do their own information gathering and that only the mediocre delegate these activities."*

---

*McCarn, Davis. "Online Systems--Techniques and Services," Chapter 4 in v. 13, Annual Review of Information Science and Technology, Wiley, 1978, p. 100.

**Sewell, Winifred and Bevan Alice. "Nonmediated Use of MEDLINE and TOXLINE by Pathologists and Pharmacists," Bulletin of the Medical Library Assn., v. 64, no. 4(Oct. 1976) pp. 382-391.

For social values to be served, again McCarn has said it very well:

> "Numerous observers have noted that computers, which seem to hold such varied and beautiful promise of expanding human alternatives and increasing freedom, seem inevitably instead to lead to reduced options, greater rigidity, and stronger bureaucracies. Charging for services has led to outcries over the demise of the free library tradition in terms of free information, but hardly a peep is heard over free access, the freedom to search for oneself."

It behooves us to recognize the arguments which justify the current reality, that is, that very little searching is done by literature users; specially trained intermediaries do almost all the online searching. The fact is that most of those arguments are simply statements of what is, rather than good reasons for the continuation of the status quo; and in most instances those statements are unsupported by any evidence, or are so unqualified as to be untestable.

---

*McCarn, op. cit. On p. 100 he summarizes from a study by Thomas J. Allen, Managing the Flow of Technology, MIT 1977. This volume is "on order" in my professional library.

To summarize, the opposition to training users to do their own online searching: end users cannot or will not take time to learn how to search; they will search so infrequently that they will not be able to remember the details of the process; and searches cannot be run unless they do; the system and the databases change so much and so frequently that nothing less than dedicated study enables searchers to keep up--and they cannot search unless they do.

It was not our purpose to resolve, or even arrive at an adequate statement of the question. We simply attempted to make it possible for alternatives to the present user-intermediary-search model to develop. We envisaged an online search environment wherein a tutorial and training component was embodied with the same accessability as the search services, and which could be used to review and refresh the searchers' skills whenever such a need arose. (See schematic, p. 4.)

We made the TRAINER as one possible form of the teaching/training component, and, at the University of Pittsburgh, we have made it as accessible as the online services.

The development of TRAINER, its contents and strategies of presentation of the content to be learned, was a major part of the work reported here. Evaluation of TRAINER was a continuous process, with users from within and outside the University participating from its earliest operation, to the present time, and continuing probably as long as TRAINER is kept operational on the computer system. The most valuable data is that from our final test population, graduate students,teaching and research faculty, of the Chemistry Department, University of Pittsburgh.

The results of use by those 15 individuals are detailed in the body of this report; they show a definite, strong need and capability on the part of a small select segment of this professional group for personal management of their own online searches.

Design of TRAINER

The specific goal of the Project was the design, development, and testing of computer assisted learning modules for users, specifically end-users, of online services which provide scientific and technical databases of indexes and abstracts of documents.

Our first decision was to develop the program to include the specifics of DIALOG^{TM} and ORBIT^{TM} because the DIALOG^{TM} and ORBIT^{TM} systems and their relatives (e.g., RECON, MEDLINE) are used by so many institutions, and they encompass most of the generally available machine readable files. BRS (Bibliographic Retrieval Services) was just becoming available so we decided to delay its incorporation until we could assume it was relatively stable, and we had gained skill ourselves in the training process. Later when we were ready for expanding the training base, our resources were absorbed in adjusting to the major search and database changes which ORBIT IV represented.

The chosen systems make a good learning environment, for although they constantly converge, there are sufficient differences in command options, operations performed, and database attributes to stimulate the comparison student user to consider relative values of these different capabilities, and, perhaps to conjure up more useful direction for future change and development.

Our next task was the isolation of those search commands and capabilities which were necessary to effective use of the search services. This proved to be difficult, and a process that continued to the end of the project. Choice of the basic command sets was easy, but decisions had to reflect our design constraint of program portability which included considerations of program and database size. Thus we had little problem about eliminating the online thesaurus capability of DIALOG, for example, which required too much storage, and is not universally available in the database. But we had problems on the question of full-text searching. On ORBIT we could readily justify exclusion since alternative techniques were more useful and cost effective. For DIALOG, not so, since proximity indicators had great utility for combining the single words of the title indexing, for example.

We finally compromised on this: we teach the (W) operator in the Computer Assisted Learning and Practice Modules (CALP), but did not implement it in Module A, the DIALOG^{TM} emulator. Trainees do not seem to have any problem with this; once online to DIALOG^{TM} they use (W) skillfully. (See Cases 1,2, Transcripts of Test Performance.)

We decided to implement all of the symbolic forms of the DIALOG^{TM} commands on the emulator, because the cost was negligible, though most have little or negative value compared to mnemonic abbreviated forms. (Our choices of best command forms are those given in the Trainer Pocket Reference Guide.)

A complete list of our final choices of commands and capabilities to be implemented and not to be implemented (see following table) includes character substitution, internal and terminal, but only AUTHOR, TITLE field qualifiers are used. While this might seem to be an uneven kind of development, we could see no other way to teach the procedures for optimizing term entry; whereas the notion of use of field qualifiers is easily extended to all searchable fields. To minimize complexity but not to skip really useful capabilities was the guiding principle here.

13

EMULATORS ONLINE COMMANDS*

FUNCTIONS	DIALOG	ORBIT
(1) HOUSEKEEPING		
Starting search after login	BEGIN B ! (use with or without file number)	(Entry of any search statement or term or any command "expected" by ORBIT)
Terminating search Disconnecting from system	END = LOGOFF	STOP
Asking for list of accessible data base files	BEGIN (without file no.) ?FILES	FILES?
Elapsed time/cost	.COST (gives elapsed time and cost)	Elapsed time given at file change and end of search
Deleting search statements no longer needed	(BEGIN or BEGINn erases work done to that point)	(Not implemented) (FILE name, i.e., changing files erases previous work)
(2) SEARCHING		
Entering search terms	SELECT S # (with words, E numbers, range of E numbers)	(If entry is not a command word, it is assumed to be a search term) FIND FD
Displaying alphabetical list of terms	EXPAND E " (no thesaurus access) PAGE P	NBR (with UP and DOWN option, incl. default to DOWN)
Creating search logic	COMBINE C $ (use set numbers with AND, OR, NOT (*,+,-) operators) shortcut C1-3/+	(Usually in search mode; use AND, OR, AND NOT operators with terms or set numbers)
Changing data base files	BEGIN_____ (insert file no.) .FILE_____ (insert file no.)	FILE_____(insert file name)
Root searching	TERM? (any number of characters to right of term)	TERM: (any number of characters to right of term) with, without ALL
	THEAT?? ? (maximum number of characters to right of term)	THEAT## (specific number of characters to right of term)
Character substitution	WOM?N (one character embedded in term)	WOM#N (one character embedded in term)
	TETRA???ORIDE (specify number of characters embedded in term)	TETRA###ORIDE (specify number of characters embedded in term)
	(Not available on LRS DIALOG)	LABO:R (any number of characters embedded in term)
Restricting searches	By author (AU=) and title(/TI) fields	By author (/AU) and title (/TI) and index word (IW) and index term (IT) fields

*after Lawrence, Prewitt, Bearman, "User's Quick Guide," NFAIS, Philadelphia, March 1977

EMULATORS ONLINE COMMANDS (p. 2)

FUNCTIONS	DIALOG	ORBIT
(3) OUTPUT		
Online printing	TYPE T ' (for printing terminals)	PRINT PRT
Formatting printout	Up to 10 defined formats for each file--see file descriptions	3 defined formats: default, FULL, TRIAL, or user defines by specifying field(s) to be printed
Specifying items to be printed	Specify set number, (format), sequence number of item or range of item numbers. Same default options as LRS' DIALOG	Specify set number, number (i.e., quantity) of items. Same default option as SDC's ORBIT
		SKIP
Offline printing	PRINT PR & (used as TYPE, above) PRINT-(print cancel)	PRINT OFFLINE (used as PRINT, above)
Interrupting online output	Available, but different from DIALOG: use(control key)-O	Available, but different from ORBIT: use (control key)-O
(4) SUPPORT FEATURES		
Erasing whole lines (errors) before transmitting	Available, but different Use (control key)-U	$ and Carriage Return
Erasing single character errors of input	(Delete key)	(Delete key)
Explanation	EXPLAIN (refers trainee to CALP modules)	EXPLAIN (refers trainee to CALP modules)
Providing description of search	DISPLAY SETS DS @	HISTORY (displays list of search statements, with all ORBIT options, e.g., range: HISTORY 6-10)
Assistance on procedures	Computer Assisted Learning Modules, and local phone, WATS line	Computer Assisted Learning Modules, and local phone, WATS line

Commands not implemented on TRAINER emulators include:

1. Housekeeping

   For DIALOG, none; for ORBIT: TIME, TIME INTERVAL, TIME RESET

2. Searching:

   For DIALOG:

   Viewing thesauri: EXPAND(WORD)
   Text searching: (W), (nW), (F), (C), (L), (S)
   Stacking commands
   Saving search strategies: END/SAVE, .RECALL, .EXECUTE, END/SDI, .RELEASE
   Restricting searches: LIMIT, LIMITALL, range searching, field qualifiers except AU=, /TI
   Range searching: :(colon)

   For ORBIT:

   Deleting search statements: ERASEALL, BACKUP, RESTART
   Text searching: STRINGSEARCH, SENSEARCH
   Stacking commands
   Saving search strategies: KEEP, SAVE, SAVE CANCEL, DELETE, SAVEOLD
   Creating search logic: SUBHEADINGS, SUBS
   Restricting searches: all except /AU, /IW, /TI, /IT

3. Output

   For DIALOG:

   Online display: DISPLAY D
   Sorting: .SORT

   For ORBIT:

   Sorting: SORT

4. Support Features

   For DIALOG: ?NEWS (TRAINER News goes out in opening CALP Modules), DISPLAY SETSn

   For ORBIT: NEWS, HELP, COMMENT, ORDER, RENAME SECURITY, VERSION, TERMINAL

Every attempt was made to put everything required by the learning experience into the computer programs. The potential availability of the total TRAINER system via the teletypewriter was our ideal. In practical terms this was not possible; images of examples of correctly executed log-ins and of the system (DIALOG, ORBIT) generated file descriptions were more appropriately provided in printed form; purely expository text is not included online unless it is essential to the interactive practice.

Various forms of documentation had evolved prior to June 1978, when in our final "formative" evaluation, a relatively controlled user group of library science students were processed: twenty-seven students in a class on "Interactive Systems" elected to participate in testing TRAINER. Results of this experiment were reported fully in the June-August 1978 Report of Work in Progress.

Experience with this group resulted in our final revisions to the user documentation, which now consists of a manual, pocket reference guide, and a very brief guide to the tutorial modules.

TRAINER Manual: Computer Assisted Instruction for Users of DIALOG™ and ORBIT™, includes an overview of TRAINER, the overall training goal, and suggested learning strategies for using TRAINER, in prefatory pages. The body of the Manual is organized to correspond to the online modules; specific objectives are given for each module. Text for the first three modules is given in more detailed correspondence to the online content of the modules, since new users are more dependent on the text then than they will be as they gain experience and confidence.

The TRAINER Pocket Reference Guide for DIALOG and ORBIT was improved to make more apparent the correspondence between the functions of the commands on the three systems. And we developed a new kind of manual; an answer book for intrepid users who plunge right in with no preliminary study or use of the Manual.

This new document, the Mini-Manual for Users of TRAINER for DIALOG and ORBIT, is very brief: 8 faces! It gives all (and only!) the "correct" responses to the tutorial modules. It meets two needs: for users who have no online computer experience and hesitate with agonizing indecision, it gives confidence and a notion that, while the responses are incomprehensible (to the novice), they are certainly not impossible to construct. In other cases, where the Trainee suddenly develops a "blind spot," being unable to see how his response differs from that which he is being prompted to enter by the tutorial program, it plainly shows the exact entry to be used.

Design Constraints Imposed by "Portability" Goal

Programming Language. Our decision to make the training package maximally available to the population of end-users included optimizing the programs for implementation in other computing environments. This led to our use of FORTRAN as the programming language for the emulators, and to the development of a FORTRAN interpreter for the computer assisted learning modules, which were developed in CATALYST/PIL for the required flexibility of revision.

The decision to use the very capable lesson designer language (i.e., CATALYST/PIL) could not have been avoided due to the exploratory nature of the lesson design effort; constant revision in any other kind of language would have been prohibitively expensive and thus inhibitory to the freedom to change, delete, augment the various programs which was critical to the CAL program development. Our early thinking was that the CAL modules could only be moved to another system as a sort of "script"; that re-coding in another lesson designer language, if available, would be the most efficient mechanism for implementation.

Near the end of the project we determined that it would be feasible to develop a FORTRAN interpreter to generate FORTRAN code from the CATALYST/PIL code. Thus, we now have the best of both worlds: freedom of development and revision, with easily transportable FORTRAN code as the end form. The FORTRAN interpreter (CATRAN) for CATALYST formatted input is supplied to users of the tutorial modules on request. Thus anyone can revise or add to the tutorials using their own text editors and the simple flexible rules for CATALYST programs. (See Appendices for CATALYST programming conventions.) CATRAN will generate locally useful FORTRAN code. In effect we provide you with a lesson designer language which can be used for other teaching as well! (See notes on programs in later sections of this report, also.)

Portability constraints on emulator programs, and tutorial modules, other than language of programming, consisted of avoidance of use of capabilities unique to the University of Pittsburgh Computing System, and are discussed more fully in later sections of this report. Constraints imposed by database size do impinge on content and use of the emulators, however. We originally decided to leave the database size open-ended, but keeping files to a minimum size for manageability and economy during developmental stages. Thus file segments are of varying lengths in the present online version. We also have allowed for any number of files to be represented in the database; currently we use nine files with the DIALOG™ emulator. To avoid problems of copyright we routinely limit training documentation and tutorial examples to NTIS and ERIC files. (Tapes are supplied with NTIS and ERIC file segments as well.)

We did not attempt efficient file structure; since we had decided that our simplified environment for learning should be restricted to basic index, title word, and author name searching, we did not feel this a needed area to put developmental resources into.*

---

*See later sections for description of indexing and file building for TRAINER emulators

Implementations of TRAINER -- How Different Institutional Resources and Needs Have Been Served

Implemented versions of the original TRAINER emulator and/or computer assisted learning modules exist at Gallaudet College, Washington, D.C.; at Syracuse University School of Information Studies; at Muskingum College, Muskingum, Ohio; University of Alabama, Graduate School of Library Service; University of Pittsburgh, On-Line Training Institute. (Copies of source language programs have been supplied to other locations, but at this writing we have no word on their use.)

The implementations intended to serve in training online search specialists have been most active in setting up versions of the TRAINER emulators: the On-Line Training Institute (Pittsburgh) and the School of Information Studies, Syracuse. Both use human teachers in scheduled classes to perform teaching functions, so that the tutorial modules were not adopted; in point of fact they were not completed at the time so that transport and use were never considered. The completeness of system capabilities emulated was questionned by both institutions. The On-Line Training Center reprogrammed for total capabilities using an available, very efficient programming language (C) on their own computer, using as database somewhat longer file segments. Syracuse took a different route: they (Robert Waldstein) developed an interface program for their own inhouse SIRES retrieval system which emulates DIALOG capabilities and gives access to the ERIC files (complete, not a segment) which they maintain for institutional use. The object was not to enhance emulator capabilities (they allow use of proximity operator (W) and an added field qualifier) but rather to allow practice in a file of full scale.

These are two very different systems of emulation, driven by different needs of the two institutions; the On-Line Training Center contrasts with the Syracuse program. OTC includes multiple systems, DIALOG, ORBIT, and a version of BRS; Syracuse, to date, uses only DIALOG. The On-Line Training Center uses segments of many different files, Syracuse only one file, but a complete database. The Center is for training only, but the Syracuse emulator can be relied on for real use of the ERIC files.

Closely related to these is the implementation of the University of Alabama Graduate School of Library Service; the need to be filled is in the training of search specialists. Here the TRAINER version will include the DIALOG and ORBIT emulators; file development for the database is being revised to operate on the UNIVAC 1108. It is too early to determine whether teaching will adapt to TRAINER emulator limitation, or whether it will be felt necessary for the emulator capabilities to be augmented to include text search, S.D.I., or SAVE features, or if larger files will be a more pressing "felt" need. TRAINER emulators will work on files of any size, but the organization of the database would require changes to optimize disk use.

Another different situation exists at Gallaudet College. The need was for training and maintaining an infrequently used skill: the DIALOG search capability. The population to be trained and retrained is small: the staff of the College Library. The DIALOG emulator, as is, with either ERIC or NTIS file segment, is maintained online as a system available program. Initial training is by regular Lockheed Retrieval System's scheduled sessions with the TRAINER emulator used to practice that which was taught. When searches are prepared, staff use the emulator in "trial runs" of the procedure. The Librarian, Jim Bourg, reports much satisfaction in this use of TRAINER DIALOG emulation.

A completely different situation exists at Muskingum College, Ohio. Here the felt need is not so much for the online practice, the emulated system, as for the initial teaching competence. The trainee population is seen as the faculty itself, rather than librarian-intermediaries; thus time to attend scheduled training at off-campus sites is not feasible and on-campus expertise for such teaching does not presently exist. After a two-month interval of remote use of the Pittsburgh implemented full TRAINER (communication by long distance dial-up), they have begun to implement the tutorial modules, not the emulators, on their own PDP 11/40. Scheduled classes based on TRAINER use, plus access to Lockheed DIALOG for practice, is planned for academic year 1979-80 (Dr. Robert Landolt, Department of Chemistry).

Despite these variations in extant implementations, we believe that TRAINER, as it presently exists at Pittsburgh, is appropriate for use by its intended user population: the individual end-user, perhaps in isolation from other online searchers, at his place of work.

23

How TRAINER is Used

TRAINER is designed to be used by individuals, on their own initiative, in their own time, at their own terminals, to familiarize themselves with online database searching. Its availability, on equal, or better, terms than the search services themselves, would assure that anyone who might wish to, could learn to use the search services himself.

Davis McCarn in the current volume of the Annual Review describes TRAINER as "a more ambitious project" than the U.S. National Library of Medicine's MEDLEARN.* That may be so, but TRAINER does have some limits to its capabilities.** It was designed to bring a novice to a "first level of competence"; what this means is spelled out in detail in "Hands On Online" in the September 1978 issue of Online Review (also TRAINER MANUAL, pp. ii, 57-59).

Very briefly, the first level of competence, of the three defined levels, is one at which a user can enter the basic commands for telecommunications access, for file access, for term negotiation and entry, for set creation and manipulation using logical connectors, for on- or off-line viewing of search results, and for getting off the system. The user, after TRAINER, will be familiar enough with database file descriptions to be able to read them and use them in formulating his search statements.

Descriptions of TRAINER use by its intended client population form the bulk of our documented use (beginning p.27); a few notions about TRAINER use in preparing online search specialists (i.e., "intermediaries") are covered on the following pages.

---

*McCarn, op. cit, p. 101

**See "How Much is Enough?" Progress Report, March-May 1978, p. 11

Use in Training Librarian/Intermediaries

TRAINER has become known to the information community; those who are involved in teaching search intermediaries have generated most of the inquiries about its availability. I believe that TRAINER, as it is presently developed, can be very useful to this community, but it may require some reorganization of their teaching plans and styles. In particular they would need to observe:

1. TRAINER is not a substitute for the total DIALOG and/or ORBIT experience; it is a limited, simplified experience.*

    If you are training search specialists (level three in terms of the "three levels of search competence"), recourse to the full system will be needed to get indepth understanding and advanced skills in using large database files and text searching capabilities.

    In the instance of the On-Line Training Institute at the University of Pittsburgh, where the focus is on training information specialists, emulator capabilities were extended to incorporate all of the systems' commands and file segments were extended in length.

    It is my own belief that such elaboration of the emulations is not justifiable in economic or pedagogical terms. The cost of programming such complete systems and of maintaining them is high since the rate of changes by the service is greatest

---

*From System Development Corp., "Principles of Design: ORBIT Search Strategies, p. 1:
"When we teach ORBIT to new users, we concentrate on the simpler ways of interacting with the system, so that they can cope with the various new or different mechanical and intellectual things that are going on at one time--at the terminal and in their minds. As users become more comfortable with these basic interactions and with the basic process...in Advanced User Training [we show them] more efficient and cost-effective ways..."

in the less-used, more experimental capabilities. Pedagogically speaking, one must balance the value of the simplified environment which encourages the trainee to "overlearn" basic skills, with that of the complex environment offering free exploration of full service capabilities. MOREOVER, unless a full scale database is also incorporated, the trainee does not realize the effects of those extended capabilities in any case. Once the database becomes large enough to allow the trainee to learn how these commands operate in the full scale files, we approach duplication of the original service! and the intrinsic virtues of the emulation are long since lost.

2. TRAINER "graduates" would be ready for advanced user sessions of instruction.[1]

When a searcher has become skillful in the basic search operations, the next level of growth has two aspects: knowledge of the database files, and techniques for optimizing search efficiency. A quick review of the contents of Online will give an understanding of the complexity of the online search process; the companion journal, Database, indicates the intensive study needed to become expert in just one file as included in the particular service's database.[2]

---

[1] Training by S.D.C. and Lockheed services are regularly identified: beginners or advanced sessions. A maturing period, of about 7-10 hours actually searching online, is observed to occur before graduates of beginner sessions apply for advanced training. If TRAINER is used as a first experience for training intermediaries, we would expect that they would be appropriately placed in these "advanced" sessions.

[2] See Database, v. 1, no. 1. Note especially Dolan's article on Psychological Abstracts as it is incorporated into the B.R.S. Service. In all, 6 files are reviewed; in three cases the titles clearly state that the review is relevant to one search service database version only; in the remaining three articles all examples are taken from one service; no applicability to other service database practices is implied.

Trainee Perseverance Muskingum College

Dr. Landolt's initial meeting to extend TRAINER access to faculty was well attended; thirty-two individuals completed "Participant Background" forms and were assigned computer identification codes.

Of those thirty-two registered users, exactly half spent sufficient time online to the TRAINER to achieve more than trivial acquaintance with the search process. Table 1 summarizes background (demographic data, and expectations) of these individuals. Individuals are ranked according to the amount of online time used. Table 2 gives non-user data.

The presence of many uncontrolled variables, many of them confounding, makes any attempt to interpret the data frivolous. Users look much like non-users; the data give only a feeling for the kinds of individuals sufficiently interested in online searching at Muskingum College, Ohio, Dec.-Feb. 1978-79, to complete background data sheets and request computer account numbers.

The one dial-up terminal available was located in the cataloging area of the main library; scheduling of use was thus a factor of concern. Although a dedicated phone line was installed, for exclusive use with the project, frequent difficulties were encountered. Unfamiliarity with the terminal itself undoubtedly caused some of this; on at least one occasion several hours were lost until someone who "knew the terminal" happened by and "jiggled something" whereupon the connection became effective again!

As a result of the experiment Muskingum is installing the tutorial modules in their own PDP/11 for use in scheduled training sessions. They plan to use the CALP Modules in conjunction with training contracts with Lockheed and S.D.C. for those sessions.

TRAINER Users Muskingum College
Ranked by Online Time

Trainee	Time Online	Role	Interest Expressed (see text)	Experience (see text)
8	30-60 min.	Faculty (Math)	specific/results	none
7	30-60 min.	student	general	none
5	60-90 min.	librarian (cataloger)	specific/technique	OCLC
2	60-90 min.	student	general	none
11	60-90 min.	student	general	none
16	60-90 min.	student	general	OCLC
14	90-120 min. (1½-2 hrs.)	faculty (Engineering)	general	none
15	90-120 min.	faculty (History)	specific/technique	none
4	90-120 min.	student	general	none
6	180-210 min. (3-3½ hrs.)	student	general	BIOSIS(ORBIT)
12	180-210 min.	librarian (reference)	specific/technique	none
9	180-210 min.	faculty (Chemistry)	specific/results	none
10	240-270 min. (4-4½ hrs.)	faculty (Chemistry)	general	Science(DIALOG)
3	240-270 min.	student	specific/technique	none
13	660-720 min. (11-17 hrs.)	faculty (Biology)	specific/one system	none
1	660-720 min.	student	specific/technique	DIALOG

TRAINER Non-Users* Muskingum College

Trainee	Time Online	Role	Interest Expressed	Experience
1	0	librarian (reference)	general	OCLC
2	0	student	general	none
3	0	faculty (biology)	specific/technique	none
4	0	student	specific/technique	none
5	0	faculty (chemistry)	general	none
6	0	student	specific/technique	none
7	0	student	specific/technique	none
8	0	student	general	none
9	0	faculty (chemistry)	general	none
10	0	student	specific/technique	none
11	0	student	general	none
12	2"	librarian	general	none
13	2"	student	general	none
14	7"	student	specific/technique	none
15	15"	administration	specific/technique	none
16	16"	student	specific/results	none

*See text

Participants were asked whether they were specifically interested in learning the online dialogue (specific/technique) or whether they were just interested in the search as a process to retrieve literature references (specific/results), or whether the process as well as the product were valued as end goals in this training effort (general). Our vaguely formulated hypothesis (for possible later testing) is that responses of specific interest in results will isolate potential online search users who need only conceptual understanding of the techniques; these individuals would presumably prefer intermediary searches if available.

"Experience" means any experience with online retrieval systems; O.C.L.C., of course, means the Ohio College Library Center. DIALOG and ORBIT experience noted was minimal: a delegated search, except in the case of Professor Landolt. Professor Landolt, who initiated the Muskingum experiment, had been trained in DIALOG searching, and performed searches for himself and his colleagues.

A limited amount of investigation of the "non-user" population revealed a number of reasons for failure to follow through after the initial entry into the program. In some cases end of term and Christmas holidays brought changing assignments which did not allow trainees to come to the Library located terminal; in a few instances the individual had underestimated the time commitment prior to completing arrangements to participate. Several came aboard just to satisfy curiosity and were not per se interested in bibliographic retrieval systems; in one case, the "administration" simply wanted to get the flavour of the programs.

The data tabulated were extracted from Participant Background forms. Our purpose was not to attempt any study of which groups of individuals or what user attributes correlate with user interest or success. It is far too soon to be able to draw conclusions about a process so complex: factors of discipline or mission interaction with research and publication; of cultural penetration of the online system as a tool for research and study; of environmental constraints on access, availability of equipment, funds for searches; and many others would necessarily be a part of any such research design.

We can simply say that this group exhibited these characteristics; and that they, and the time during which experimental use occurred, were unique to this instance. The data do confirm that our trainees were primarily drawn from the population of non-librarian or information specialist population, as we intended that it should be.

Use of TRAINER at the University of Pittsburgh Feb.-May '79

The general environment at the University is one where much time and effort have been devoted to online retrieval. There was the New York Times Information Bank experiment, the in-house development of the Pittsburgh Information Retrieval System (PIRETS), and the Chemical Information Center. The University Center for International Studies produces the USPSD, U.S. Political Science Documents database, which is available through Lockheed's DIALOG system. Most recently funds are becoming available for use of the commercial services, with graduate school libraries being allocated some of the resource.

This funding has given rise to realistic expectations of use of the online search service, by user populations of the type for which TRAINER was developed, that is serious, advanced students, teachers and researchers in specialized disciplines and professions; as opposed to the information specialist or search intermediary. The demand for the training which developed in the Chemistry Department, in particular, arose and precluded any effort on the part of the TRAINER project to go out and generate a test population. This is especially fortunate since the real world environment, in which TRAINER will be used, is one where users must initiate the use of the program.

During the period from February 1, 1979, when TRAINER programs had reached their current form, through May 31, 1979, some 40+ individuals used the program. Some uses were by visitors, and not typical of a "real" user; a Case Western Reserve student, for instance, used DIALOG or ORBIT segments of all modules, and the emulators, in one session (i.e., one time continuous sitting). In other instances, use was for demonstration purposes, as at the Workshop at the Bibliographic Center for Research at Denver; here

32

teachers of online searching explored rather than "used" the programs. Use at Muskingum College, Ohio, because of difficulties with communication lines and scheduling of terminal use, was also probably not typical; it has been separated out and reviewed in the previous section.

Here we report in general terms, on the history of the 23 individuals who used TRAINER to learn how to make online searches: 16 were end-users, primarily from the Chemistry Department (15); 2 were library school students; 4 were practicing librarians; one was an instructor in education who taught online searching to other end-users. Following this general summary, several individual cases will be described in detail.

The historical data collected on literature users as developing online searchers is presented here for its suggestive value only. Our primary interest is to determine and describe the effectiveness of TRAINER in bringing motivated users to a first level of competence; and perseverance of users to complete the TRAINER program is only possibly necessary to achievement of that goal. We do have some evidence to believe that the more complete use of the program results in better performance. (See Case 4 related below.)

The seven non-chemist users were individually initiated into TRAINER use; this was limited to instructions in locating the program in the computer system and distribution of the TRAINER documents. Users who did not have any experience with computer use were shown how to log in.

Use data from the trainees of the Department of Chemistry is most fully presented, first because it represents a population very much like the population we designed TRAINER to serve, and because the manner of access to and use of TRAINER with this population is very like the postulated real world in which TRAINER was designed to function.

The chemist-trainees:

The trainees are subject specialists, not librarians or other information professionals, and they have realistic expectations of being able to exercise the new skill to satisfy their own real information needs.

Trainees are a self-selected group; their participation is completely voluntary and monitored only by the TRAINER project; results of their efforts are not visible to peers within their department, unless they themselves reveal their work. There are no time schedules or deadlines; the individuals have been requested to come to the project office when/if they wish to do so, to provide us with data by performing several "test" questions on the real system (here LRS' DIALOG^{TM}), following which they will be given access for use of DIALOG^{TM} for their own searches.

Use statistics cover the period from February 23, 1979 to May 31, 1979; an arbitrary cut off date determined solely by reporting requirements. TRAINER access will continue with no constraints, at least through August 1979.

In January 1979, the librarian of the Physics and Chemistry Libraries of the University approached the TRAINER Project as a possibility for members of his department to learn to use the DIALOG retrieval service. Funds were available and contractual arrangements had been made with Lockheed, but there was a dearth of trained users. A three day session, at $150 fee, is available in the Graduate School of Library and Information Sciences, but there were several reasons why this was not a useful training option:

1. Cost
2. Released or free time for the three days could not be arranged in most cases
3. The classes are limited to 10 individuals, and only one time per month
4. The classes are taught by and for librarians as search intermediaries

31

Approximately 30 individuals were sufficiently interested in the online search to attend sessions where TRAINER was briefly introduced; of those 15 followed through, with more or less persistence, to use TRAINER. This use is summarized in brief form on the table, "23 Users Online, Feb.-May 1979," and a case by case history is included in the appendices.

Details of the procedures of initiating the use of TRAINER with these individuals follow:

While trainees were individually self selected, and their own motives brought them to volunteer as "subjects" to use TRAINER, they responded in such numbers that group scheduling was necessary.

Accordingly, two small groups were brought together. After general interaction on the nature, extent, value of online searching, the volunteer trainees were given the three TRAINER documents and computer account numbers.

Each participant was requested to complete a sheet of demographic data and to indicate experience in bibliographic search (conventional or computer-based). He also indicated breadth of interest by checking off which of the several systems he would like to know, and the kind of interest he feels: whether he is currently just interested in the search process and its potential future values, or whether he wants to know just enough to get needed references, or if he has the need for references, and is interested in the search process as well.

They were then instructed:

1. To proceed on their own initiative to use the tutorial and emulator
2. To record their perceptions of the value and effectiveness of the TRAINER experience on the brief TRAINER questionnaire
3. To return when ready to try their skill online to the Lockheed System or to the System Development Corporation.

They were told that the only record of the online use of TRAINER would be an account of dates and times and of program modules accessed.

Trainees who had no previous experience in using the University Computing System were shown individually how to login and were given a chance to practice and the transcript of the practice session to take with them. The initial experience, or the presence of an observor, seems to interfere with reading or comprehension of textual messages for some users.

While data is scanty, we can discern certain patterns which individual users follow. Evident on the summary: Case 1 tended to spend less time per module at any one session, but made frequent returns; Cases 2 and 3 spent much more time on each module, but seemed to be "finished" with it, not repeating. In the instance of Case 2, however, at the time of the "test performance," Module 2, telecommunication access was briefly revisited prior to getting online to DIALOG. This "refresher" use is one of the anticipated values of having TRAINER online of course.

Most users followed a pattern of using CALP modules (tutorials) followed by sessions on emulators; this is in fact suggested in the CALP modules. The very restricted CALP experience is thus immediately transferred to the more realistic and more demanding use of the emulators; from the relatively passive role of student to the independence of the commanding role of practitioner.

Very few used ORBIT segments of CALP modules or the ORBIT emulator. This is a direct reflection of the training environment; the Chemistry Dept. Library is offering DIALOG searching only. The fact that some individuals were motivated--by whatever reason, unknown here--to use ORBIT segments at all is quite interesting.

The tables which follow summarize online use, from February through May 1979, of the TRAINER tutorials, modules 1-7, and the DIALOG and ORBIT emulators, Modules A and B. The appended "User Histories" give detailed reports of the separate chronologies.

Four individual histories are then reviewed in detail; they are identified on the summary table (following page) as Cases 1-4. The results of online "tests" of these four individuals are also given, with some analysis. Transcripts of the online test are inserted. User histories for these four cases can be identified in the appendix:

Case 1	134057,174671
Case 2	134057,234272
Case 3	134057,261141
Case 4	134057,304304

23 TRAINER Users Online Feb.-May 1979

User #	Type	Logged in Time	Number of Online Sessions	Average Length of Session	Program Complet
247151	1	186 min.	3	62 min.	no
262461	2	299	6	45	yes
377304 263631 263621	1	455	8	57	yes
142376	4	67	2	34	no
010730	4	561	5	112	no
030734	2	119	9	13	no
100746	5	40	1	40	no
152461	4	184	2	92	yes
152521	4	272	10	27	no
174671 (Case 1)	4	508	14	36	yes*
224270	4	51	3	17	no
234272 (Case 2)	4	250	8	31	yes*
244274	4	80	3	27	no
261141 (Case 3)	4	493	6	82	yes*
264300	4	172	3	57	yes
304304 (Case 4)	4	403	7	57	no!*
314306	4	5	1	5	no
324310	4	532	9	59	yes
334312	4	18	1	18	no
340720	4	145	4	36	no
020732	3	126	2	63	yes
110652	2	95	3	32	no
110750	2	70	3	23	no
	Total	5131	Total 113	Ave. 45	9 yes 14 no

User Types:

1 Student in information science
2 Information professional - practicing
3 Information professional - teacher
4 Chemistry Dept., University of Pittsburgh
5 Biology Dept., University of Pittsburgh

*Indicates online real system "test" data available; 174761 and 234272 are fully reported in following pages, as Case 1 and Case 2.

Visitors and other demonstration uses not included; Muskingum users also not included in this summary.

The table of "23 TRAINER Users Online Feb.-May 1979" includes only users at the University who approached the Project as a way to satisy a recognized, "felt," need; they became aware of TRAINER by word of mouth primarily. No general publicity had yet been released to the general user community.

Individuals were encouraged to complete the program and to return to the Project office to be tested in use of the real DIALOG or ORBIT system, but were not required to do so as any condition of use. Further, the program is generally known to be of continuing availability, so that the uses shown reflect a "slice" of the use of TRAINER, rather than a completed segment of use.

For all users:

Average total time online	3 hrs, 44 minutes
Average number of sessions	5
Average length of a session	45 minutes

For users who have completed the program:

Average total online time	5 hrs, 35 minutes
Average number of online sessions	7.4
Average session length	45 minutes

The increase in online time to complete the program is expected; another two to three sessions are needed by most of the "unfinished" users. Session length averages to 45 minutes for all users.

Case by Case Statistics of Use

The two cases which we have presented most fully seem to represent the widest divergence in style of use of the TRAINER. We here look at the use of the modules in terms of time spent online to the computer programs. (See also user 17461 in "User Histories" appended.)

Case 1

Overall summary: 8 hours 28 minutes "logged in" time*

Use took place during 14 separate sessions spread over six weeks (February 23-April 2). Average length of a session online was 36 minutes; ranging from 14 minutes to 71 minutes at any one sitting.

Since his chosen system for study was DIALOG, most of his work was done in DIALOG module segments:

Module	No. of Uses	Ave. Use Time	Total Time
3 (search overview)	6	4 min.	24 min.
4 (database features)	5	8.8 min.	44 min.
5 (search vocabulary)	5	4 min.	23 min.
6 (logical operators)	3	6.6 min.	20 min.
7 (output formats)	3	10 min.	33 min.
A (DIALOG™ emulation)	14	17.6 min.	244 min.

Modules 1 and 2, Pitt login and network access, were less used due to earlier facility in these skills.

---

*"Logged in time" includes an increment of time between modules or module segments which is not included in other totals. This is apparently "thinking" or resting time when the user does not logoff, but does not start another "lesson" immediately.

Following the "test" using his DIALOG™ skills, Case 1 has begun studying ORBIT™. His progress is very similar to the DIALOG™ experience:

Module	No. of Uses	Ave. Use Time	Total Time
3 (Search overview)	2	6 min.	12 min.
4 (Database features)	2	8 min.	16 min.
5 (Search term entry)	2	7 min.	14 min.
6 (Logical operators)	1	3 min.	3 min.
7 (Output control)	1	5 min.	5 min.
B (ORBIT™ emulator)	1	(time lost)	--

Use of ORBIT™ program segments is very obviously "in progress," and to be completed.

Case 2 (User History 134057,234272)

Overall time online, 3 hours, 52 minutes, in seven sessions plus one refresher of two minutes.

Average session length: 33 minutes;

Shortest session: 18 minutes;

Longest session: 70 minutes.

Again the chosen system was DIALOG, so very little time was used in study of the ORBIT module segments or emulator (5" in ORBIT™ emulator).

Module	No. of Uses	Ave. Use Time	Total Time
3 (Search overview)	3	7 min.	21 min.
4 (Database features)	4	5 min.	20 min.
5 (Search vocabulary)	1	6 min.	6 min.
6 (Logical operators)	2	9 min.	18 min.
7 (Output formats)	1	14 min.	14 min.
A (DIALOG™ emulator)	5	25 min.	128 min.

Case 3 (User History 134057,261141)

Overall time online, 5 hrs. 27 minutes in six sessions between April 28 and May 6, 1979.

Average session length: 54 minutes

Shortest session: 28 minutes

Longest session: 76 minutes

DIALOG was the system studied; with brief examination of ORBIT following the completed DIALOG programs.

Module	No. of Uses	Ave. Use Time	Total Time
1 (Pitt login)	2	8½ min.	17 min.
2 (TYMNET,TELENET)	5	1+ min.	7 min.
3 (Search overview)	3	7 min.	20 min.
4 (Database features)	(apparent oversight)		0
5 (Search vocabulary)	2	7 min.	14 min.
6 (Logical operators)	2	7½ min.	15 min.
7 (Output formats)	2	11½ min.	23 min.
A (DIALOG™ emulation)	7	29 min.	203 min.

In ORBIT™ study, Case 3 spent 4 minutes in the overview module, 6 minutes on database features, 7 minutes on vocabulary negotiation, and 11 minutes in the ORBIT™ emulator.

Case 4 (User History 134057,304304)

This was a student user; his study was restricted to Module 3, the search overview, and the DIALOG emulator. Performance on the test was markedly poorer than that of other trainees tested (see more detailed Case analyses which follow) and some of the deficiencies in his performance are identifiable with the contents of the modules which he did not use.

Module	No. of Uses	Ave. Use Time	Total Time
3 (Search overview, ORBIT$^{\text{TM}}$ segment)	2	11½ min.	23 min.
3 (Search overview, DIALOG$^{\text{TM}}$ segment)	3	13 min.	40 min.
A (DIALOG$^{\text{TM}}$ emulator)	3	24 min.*	47 min.*

*One session record lost due to use of 〈break〉 to abort usual logoff process; average and total for 2 sessions

Case 1

Trainee, graduate student, Chemistry Department, familiar with printed Chemical Abstracts, expressed desire to study the search procedures, with immediate need for literature searching, on both DIALOG and ORBIT systems.

He expressed negative interest in PIRETS, the in-house service, probably due to its non-scientific database, and to BRS for unknown reasons, but lack of familiarity certainly figured.

Trainee was familiar with computer usage and had attended training sessions for PIRETS.*

Trainee obtained computer account number on February 23, 1979; on March 8, 1979 he successfully completed the "test questions" on the Lockheed DIALOG System.

A summary of Case 1 online use of TRAINER and a description of his performance on the "test questions" while online to DIALOG^{TM}, Palo Alto, follow.

---

*PIRETS is an online search, but not an interactive one. As described in Appendix 6, it uses a "fill in the blanks" approach to strategy building, and provides no intermediate feedback. The search is run immediately or on a delayed basis, following entry of search parameters. It provides some experience of value to the development of the general concept of an online search, but is not helpful in developing the notion of complex command languages of the DIALOG, ORBIT genre.

A session by session review of his use of TRAINER: (Case 1)

Session No.	Times Online	- Totals	Modules Used
1 (Feb. 23)	6 minutes	6 minutes	(Index Only)
2 (Feb. 23)	4 minutes		2 TYMNET, TELENET
	14 minutes		3 Overview: DIALOG
	25 minutes		A Emulator: DIALOG
	33 minutes	76 minutes	4 Database: DIALOG
3 (Feb. 27)	10 minutes		5 Term entry: DIALOG
	11 minutes		4 Database: DIALOG
	30 minutes	51 minutes	A Emulator: DIALOG
4 (Feb. 28)	11 minutes		6 Logical operators: DIALOG
	6 minutes	17 minutes	5 Term entry: DIALOG
5 (Mar. 1)	15 minutes		7 Output formats: DIALOG
	15 minutes	30 minutes	A Emulator: DIALOG
6 (Mar. 5)	28 minutes	28 minutes	A Emulator: DIALOG
7 (Mar. 6)	16 minutes		A Emulator: DIALOG
	5 minutes		3 Overview: DIALOG
	7 minutes		4 Database: DIALOG
	6 minutes		5 Term entry: DIALOG
	6 minutes		6 Logical operators: DIALOG
	9 minutes		7 Output format: DIALOG
	3 minutes	52 minutes	1 Pitt Login
8 (Mar. 7)	35 minutes		A Emulator: DIALOG
	17 minutes		A Emulator: DIALOG
	20 minutes		A Emulator: DIALOG
	9 minutes	81 minutes	A Emulator: DIALOG

Overall Online Time 341 minutes (5 hrs. 41 minutes)

At this point the trainee attempted the "test" use of the real DIALOG system (transcript on following pages). He had spent under six hours online to TRAINER in eight separate online sessions, prior to the "test."

The "test" required the trainee to get online, given the TYMNET and TELENET phone numbers, to answer the following questions, using ERIC and NTIS files; and to close the session.

Q1. An article on personnel management which included the phrase MOTIVATION THEORY in the title;

Q2. An article on hydrogen fluoride lasers by an author named TRAINER or TRAINOR.

After a quick look at the questions, and using only TRAINER's Pocket Reference Card, the Trainee dialed in to the network. He succeeded despite initial confusion with two "passwords" and an "all parts busy" message.

His pursuit of Question 1 was direct; he recognized that the Login File was the appropriate one for the question. He tried SMOTIVATION THEORY/TI, quickly changed to SMOTIVATION(W)THEORY, got too many postings and re-entered the phrase with /TI qualifier. After selecting PERSONNEL (W)MANAGEMENT he used C3 AND 4 to isolate the one item. TYPE statement used with no problem.

He used END, followed by BEGIN6 to change files; used EAU=TRAINER, PAGE, and SELECTed a range of E numbers to get the Author set for Question 2. Since the two suggested forms of the name (TRAINER, TRAINOR) came out in one alphabetical sequence, this was the best choice to make the SELECT statement. Next he created a LASER set; this, with the AUTHOR set gave 8 hits. To reduce this set he created a HYDROGEN(W)FLUORIDE set which he combined with the AUTHOR-LASER set--getting 0 hits. He then created a LASER? set which he combined with the AUTHOR-HYDROGEN(W)FLUORIDE set to retrieve the target document.

Two mechanical errors were noted: use of multiword term with /TI qualifier, and use of disjoint series in combine with set range shortcut. In both cases he quickly corrected or used a form he understood better.

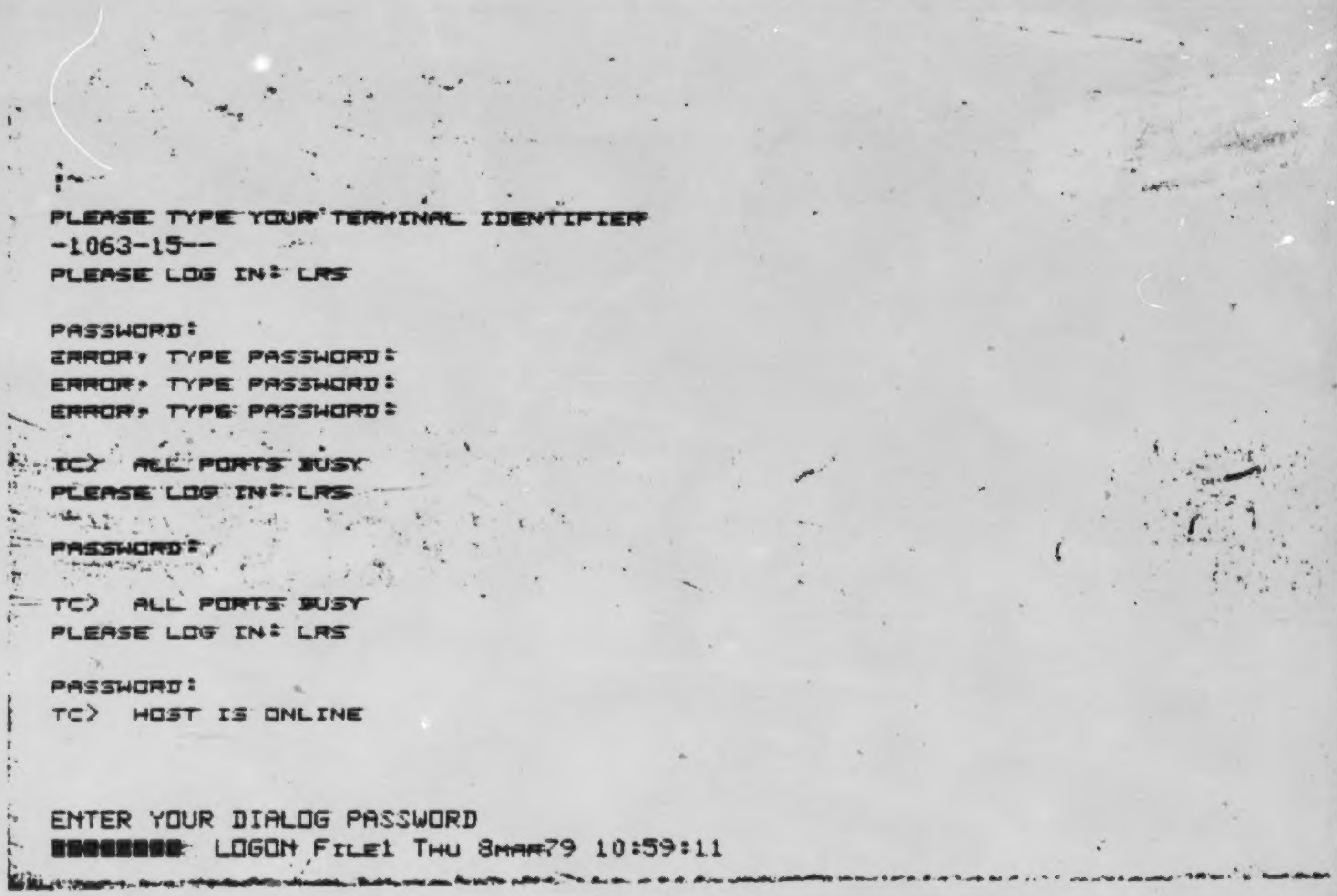
Total time online 11 minutes; this included 2 EXPAND displays and 2 documents typed out in FORMAT 5. Transcript of test performance follows.

Following the "test," trainee continues to use TRAINER in preparing actual searches, and to begin learning to use ORBIT.

48

Capabilities Demonstrated in Online "Test," Case 1

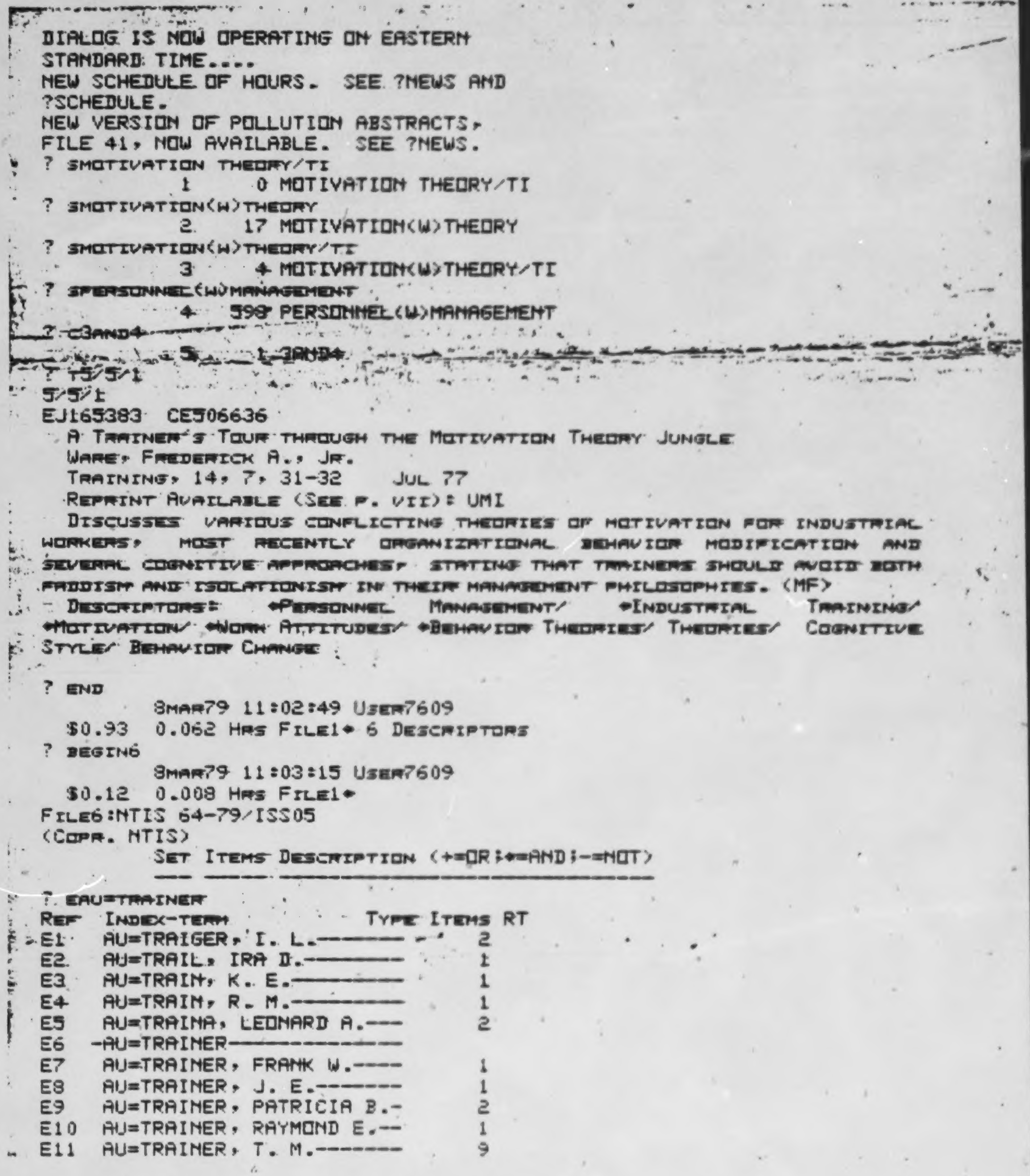
Command Name	Use (Form of Entry: Abbreviation, Spacing)
LRS; LOCKHEED	on separate lines
DIALOG PASSWORD	no problem
BEGIN	BEGIN (with file no., no spaces)
.FILE	(not used)
?FILES	(not used)
EXPAND	E(without spaces)
/TI	(not used)
/AU	EAU=
PAGE	P
SELECT	S(without space)
(W)	(W)
/TI	/TI
AU=	(not used)
RANGE of E no's	SE7-29
COMBINE	C(without space)
NOT, AND, OR	AND
Set range shortcut	(incorrect use)
TYPE	T(without space)
Set no. only	(not used)
Set/format	(not used)
Set/format/item	T5/5/1
PRINT	(not used)
END	END
DISPLAY SETS	(not used)
root search	single ?
Character substitution	(not used)
LOGOFF	LOGOFF



```
PLEASE TYPE YOUR TERMINAL IDENTIFIER
-1063-15--
PLEASE LOG IN: LRS

PASSWORD:
ERROR, TYPE PASSWORD:
ERROR, TYPE PASSWORD:
ERROR, TYPE PASSWORD:

TC>  ALL PORTS BUSY
PLEASE LOG IN: LRS

PASSWORD:

TC>  ALL PORTS BUSY
PLEASE LOG IN: LRS

PASSWORD:
TC>  HOST IS ONLINE


ENTER YOUR DIALOG PASSWORD
[redacted] LOGON File1 Thu 8mar79 10:59:11
```

Case 1   Test Performance, p. 1

Login



```
DIALOG IS NOW OPERATING ON EASTERN
STANDARD TIME....
NEW SCHEDULE OF HOURS.  SEE ?NEWS AND
?SCHEDULE.
NEW VERSION OF POLLUTION ABSTRACTS,
FILE 41, NOW AVAILABLE.  SEE ?NEWS.
? smotivation theory/ti
            1      0 MOTIVATION THEORY/TI
? smotivation(w)theory
            2    17 MOTIVATION(W)THEORY
? smotivation(w)theory/ti
            3      4 MOTIVATION(W)THEORY/TI
? spersonnel(w)management
            4   598 PERSONNEL(W)MANAGEMENT
? c3and4
            5      1 3AND4
? t5/5/1
5/5/1
EJ165383  CE506636
  A Trainer's Tour through the Motivation Theory Jungle
  Ware, Frederick A., Jr.
  Training, 14, 7, 31-32    Jul 77
  Reprint Available (See p. vii): UMI
  Discusses various conflicting theories of motivation for industrial
workers, most recently organizational behavior modification and
several cognitive approaches, stating that trainers should avoid both
faddism and isolationism in their management philosophies. (MF)
  Descriptors:  *Personnel Management/  *Industrial  Training/
*Motivation/ *Work Attitudes/ *Behavior Theories/ Theories/  Cognitive
Style/ Behavior Change

? end
          8mar79 11:02:49 User7609
  $0.93  0.062 Hrs File1* 6 Descriptors
? begin6
          8mar79 11:03:15 User7609
  $0.12  0.008 Hrs File1*
File6:NTIS 64-79/ISS05
(Copr. NTIS)
          Set Items Description (+=OR;*=AND;-=NOT)
          --- ----- -----------------------------
? eau=trainer
Ref  Index-term             Type Items RT
E1   AU=TRAIGER, I. L.-------      2
E2   AU=TRAIL, IRA D.--------      1
E3   AU=TRAIN, K. E.---------      1
E4   AU=TRAIN, R. M.---------      1
E5   AU=TRAINA, LEONARD A.---      2
E6  -AU=TRAINER--------------
E7   AU=TRAINER, FRANK W.----      1
E8   AU=TRAINER, J. E.-------      1
E9   AU=TRAINER, PATRICIA B.-      2
E10  AU=TRAINER, RAYMOND E.--      1
E11  AU=TRAINER, T. M.-------      9
```

Case 1   Test Performance, p. 2
First question completed, file change and
beginning of second question

```
E12  AU=TRAINER, THOMAS M.----        5
E13  AU=TRAININ, L. YA.-------        1
E14  AU=TRAINIS, V. V.--------        1
E15  AU=TRAINOR, D.-----------        4
E16  AU=TRAINOR, D. W.--------        2
E17  AU=TRAINOR, DANIEL W.----        5
E18  AU=TRAINOR, F.-----------        2
E19  AU=TRAINOR, F. R.--------        4
E20  AU=TRAINOR, J. H.--------       17
                                   -more-
? p
Ref  Index-term            Type Items RT
E21  AU=TRAINOR, J. T.--------        1
E22  AU=TRAINOR, JAMES H.-----        1
E23  AU=TRAINOR, MARY A.------        1
E24  AU=TRAINOR, R. J.--------        6
E25  AU=TRAINOR, ROBERT J. JR         2
E26  AU=TRAINOR, T.-----------        1
E27  AU=TRAINOR, T. A.--------        4
E28  AU=TRAINOR, W. LYNN------        3
E29  AU=TRAINOR, WILLIAM L.---        1
E30  AU=TRAISTER, R. E.-------        1
E31  AU=TRAJIC, DRAGUTIN------        1
E32  AU=TRAJMAR, S.-----------       10
E33  AU=TRAJMAR, SANDOR-------       11
E34  AU=TRAKAS, R. C.---------        1
E35  AU=TRAKHBROT, B. M.------        1
E36  AU=TRAKHMENBERG, I. M.---        1
E37  AU=TRAKHTENBERG, A. KH.--        1
E38  AU=TRAKHTENBERG, E. M.---        1
E39  AU=TRAKHTENBERG, F. I.---        1
E40  AU=TRAKHTENBERG, I.------        1
                                   -more-
? se7-e29
           1    75 E7-E29
                   E6: AU=TRAINER
? slaser
           2  9987 LASER
? c1and2
           3     8 1AND2
? shydrogen(w)fluoride
           4   525 HYDROGEN(W)FLUORIDE
? c3and4
           5     0 3AND4
? slaser?
           6 15226 LASER?
? c1,4,6/+
          C1,4,6/+
          Invalid set-range operator
? c1and4and6
           7     1 1AND4AND6
```

Case 1   Test Performance, p. 3

Question 2 completed

```
? T7/5/1
7/5/1
Fluorine Dissociation Study for Pulsed Chemical Lasers

Avco Everett Research Lab Inc Everett Mass*Office of Naval Research,
Arlington, Va.   (048450)

Final technical rept. 1 May-31 Dec 74
AUTHOR: Chen, H. L.; Trainor, D. W.; Fyfe, W. I.; Center, R. E.
C5353H2    Fld: 20E, 7D, 46C, 99F   GRAI7524
Jan 75   86p
Contract: N00014-74-C-0367
Monitor: 18

Abstract: This report presents experimental results for the
dissociation of F2 in electron beam sustained discharges. Two
diagnostic techniques were developed for the measurement of transient
F atom concentration with sensitivity as high as F/F2 = or > 0.00001.
The sustainer enhancement factor derived from these experiments is
small, <2, and appears to be mainly due to dissociation of F2 by
collisions with energetic ions. Measurements were also made of the
effect of additives, such as SF6 and CF4, which exhibited negligible
enhancement effect in sustained discharges.

Descriptors: *Chemical lasers, *Fluorine, *Dissociation, Hydrogen
fluoride, Electron beams, Electric discharges, Reaction kinetics,
Collisions, Energy transfer, Test methods, Measurement, Additives,
Carbon tetrafluoride, Gas ionization, Helium, Argon, Vibrational
spectra, Recombination reactions, Sulfur compounds

Identifiers: *Hydrogen fluoride lasers, Sulfur hexafluoride, NTISDODN

AD-A015 130/8ST   NTIS Prices: PC A05/MF A01

? LGOOGOFF
          LGOOGOFF
          Invalid argument
? LOGOFF
        8Mar79 11:10:10 User7609
  $1.76  0.117 Hrs File6 27 Descriptors

LOGOFF 11:10:13


TC>  DROPPED BY HOST SYSTEM


PLEASE LOG IN: ~-[σ)s~H+)$+GI|RvsJwGw9*Tv8H?#~9)+65(~Lv,c7H?+tE=s>>?7+68S||!+G<V
|oW.es∂yw~)I6aNWA>?c~
```

Case 1   Test Performance, p. 4

Results of Q2 printed online, and end of session

Case 2

This trainee described himself as "Graduate Researcher" in the Chemistry Department. He uses *Beilstein*, *Chemical Abstracts*, *Chemical Titles*, *Science Citation Index*, in printed versions. He had no experience with online searching (PIRETS gives access to *Psychological Abstracts* and *ERIC* only), but does use the computer in his work.

His interest for the use of TRAINER was general, in that he was equally interested in learning the search process and in using the contents of the online database, but specific in that he was interested only in the DIALOG system.

Trainee obtained computer account number and TRAINER documents February 23, and finished the use of the Modules by March 15. The end of term rush and finals intervened; on April 16, 1979 he reviewed parts of the TRAINER program prior to completing, successfully, the online "test" questions.

A summary of online sessions, Case 2:

Session No.	Times Online	- Totals	Modules Used
1 (Feb. 24)	1 minute	1 minute	1 Pitt Login
2 (Feb. 24)	17 minutes	17 minutes	2 TYMNET, TELENET
3 (Feb. 24)	23 minutes	23 minutes	3 Overview: DIALOG
4 (Mar. 8)	5 minutes		B Emulator: ORBIT
	20 minutes	25 minutes	A Emulator: DIALOG
5 (Mar. 9)	44 minutes	44 minutes	A Emulator: DIALOG
6 (Mar. 9)	52 minutes	52 minutes	A Emulator: DIALOG
7 (Mar. 15)	34 minutes		4 Database: DIALOG
	14 minutes		A Emulator: DIALOG
	8 minutes		4 Database: DIALOG
	6 minutes		5 Term entry: DIALOG
	18 minutes		6 Logical operators: DIALOG
	14 minutes	94 minutes	7 Output formats: DIALOG
8 (Apr. 16)	4 minutes	4 minutes	2 TYMNET, TELENET

Overall Online Time 260 minutes (4 hrs 20 minutes)

After 7 learning sessions, about 4 hours 15 minutes online, plus a quick review of the TYMNET and TELENET login the trainee was given the "test" sheet reproduced below, and a DIALOG password.

Performance Test as Given to Trainee #2

Use ERIC (1) or NTIS (6)

1. Find an article on industrial training which has the phrase "motivation theory" in the title. Have one document printed online in fullest format.
2. Find an article by Trainer (or Trainor) and H.L. Chen and W.I. Fife (or Fyfe), on hydrogen fluoride lasers. Type it, in short form, online.
3. Find articles on tetrachloride or tetrafluoride, not on lasers.

TYMNET	91-765 1320
TELENET	91- 288 9950

Question 1 was reworded to make the decision to use ERIC somewhat more obvious, although in Case 1 there had been no obvious uncertainty (Personnel Management was used, rather than Industrial Training).

In Question 2 we added a more difficult problem in author searching: the questionable spelling being evidenced in the second character of the name (FIFE, FYFE).

Question 3 was added to force use of the character substitution capability if the Trainee remembered it, and NOT logic.

Trainee logged in with minimal confusion about the two "passwords"; this difficulty does not arise so often when users are taught to enter LRS; DIALOG on one line.

He obviously had control over the multiword-single word aspects of the vocabulary of the index; single words joined by (W) were used immediately with the /TI qualifier; whereas INDUSTRIAL TRAINING was used, unqualified as a descriptor.

His error in using S instead of C in the logical statement has not been observed to happen often, but having occurred might be difficult for the novice user to recognize. This user did see it, however, and had no problem with the TYPE statement, calling for set, format, and item. (See p. 1 of transcript which follows.)

In changing files, FILE 6 was entered, followed by .FILE6. SELECTing the author names caused great difficulty. Trainee did not use EXPAND immediately, and he was not sensitive to the use of spaces following punctuation in the name forms, using them randomly. His use of character substitution in second character position in SELECT and EXPAND was not felicitous. (See p. 2 of transcript which follows.)

On the third page of the test transcript the author name dilemma is resolved in a businesslike fashion; SELECTs on truncated forms of the two possible spellings. One name form FYFE, COMBINED with his HYDROGEN(W)FLUORIDE AND LASERS set brought out the desired reference.

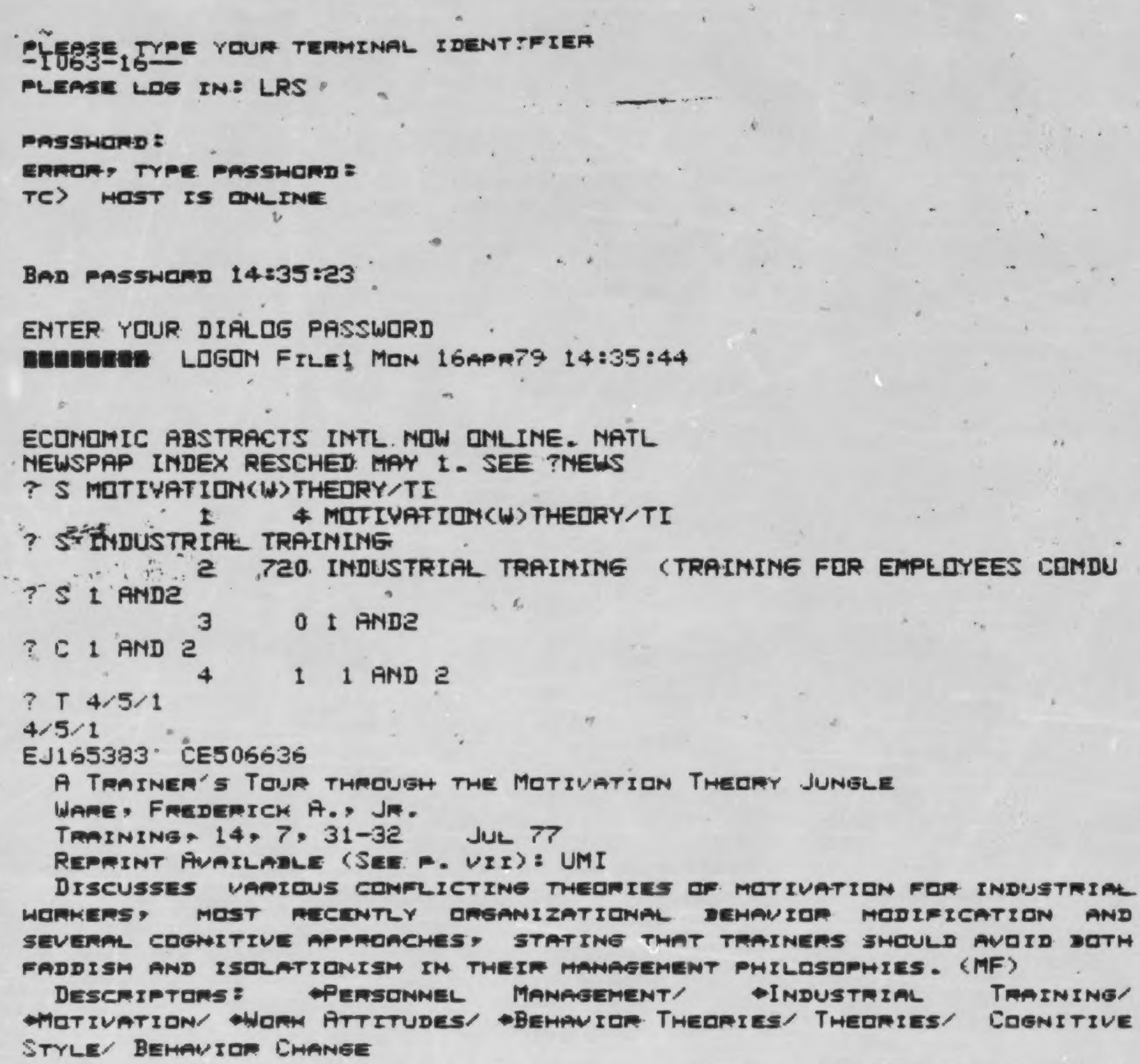
On p. 4 of the test transcript the 3rd question came off nicely; he apparently was testing differential performances of the truncated LASER? and the plural LASERS, but used the more inclusive truncated form in the logical statement.

On p. 5 trainee attempted to use both the mnemonic and symbolic form of the DISPLAY SETS command--a misreading of the documentation. It followed a general failure to use any symbolic forms, not even in use of the +, *, - which is most commonly adopted by new users. The native language of this individual was not English, which may account for the difficulty.

Again on p. 5, trainee recovered, using a complete but mispelled command. The erroneous ERROR DIAGNOSIS didn't confuse him--most trainees (and all computer users!) quickly learn to rely more on their own analysis of errors.

Capabilities Demonstrated in Online "Test," Case 2

Command Name	Use(Form of Entry: Abbreviation, Spacing)
LRS; LOCKHEED	On 2 lines
DIALOG PASSWORD	(confused with TELENET password first time)
BEGIN	(not used)
.FILE	.FILE 6
?FILES	(not used)
EXPAND	E (with space)
/TI	(not used)
/AU	(incorrectly used) (AU= omitted)
PAGE	(not used)
SELECT	S (with space)
(W)	(W)(no spaces)
/TI	/TI
AU=	S AU= (with space)
Range of E no's	(not used)
COMBINE	C (with space)
NOT, AND, OR	AND (with spaces)
Set range shortcut	(not used)
TYPE	T (with space)
Set no. only	(not used)
Set/format	(not used)
Set/format/item	17/6/1, 17/5/2
PRINT	(not used)
END	END=
DISPLAY SETS	DISPLAY SETS
root search	AU=CHEN?
Character substitution	single & multiple?'s
LOGOFF	LOGOFF



```
PLEASE TYPE YOUR TERMINAL IDENTIFIER
-1063-16--
PLEASE LOG IN: LRS

PASSWORD:
ERROR, TYPE PASSWORD:
TC>  HOST IS ONLINE


Bad password 14:35:23

ENTER YOUR DIALOG PASSWORD
[redacted]  LOGON File1 Mon 16apr79 14:35:44


ECONOMIC ABSTRACTS INTL NOW ONLINE. NATL
NEWSPAP INDEX RESCHED MAY 1. SEE ?NEWS
? S MOTIVATION(W)THEORY/TI
            1      4 MOTIVATION(W)THEORY/TI
? S INDUSTRIAL TRAINING
            2    720 INDUSTRIAL TRAINING  (TRAINING FOR EMPLOYEES CONDU
? S 1 AND2
            3      0 1 AND2
? C 1 AND 2
            4      1  1 AND 2
? T 4/5/1
4/5/1
EJ165383  CE506636
  A Trainer's Tour through the Motivation Theory Jungle
  Ware, Frederick A., Jr.
  Training, 14, 7, 31-32    Jul 77
  Reprint Available (See p. vii): UMI
  Discusses  various conflicting theories of motivation for industrial
workers,  most  recently  organizational  behavior  modification  and
several cognitive approaches,  stating that trainers should avoid both
faddism and isolationism in their management philosophies. (MF)
  Descriptors:   *Personnel   Management/   *Industrial   Training/
*Motivation/ *Work Attitudes/ *Behavior Theories/ Theories/  Cognitive
Style/ Behavior Change
```

Case 2   Test Performance, p. 1

Login and Q1 Complete

```
? FILE 6
         FILE 6
         INVALID COMMAND CODE
? .FILE 6
        16APR79 14:39:13 USER7609
  $0.90  0.060 HRS FILE1* 3 DESCRIPTORS
FILE6:NTIS 64-79/ISS08
(COPR. NTIS)
? S AU=CHEN,H?
          5      0 AU=CHEN,H?
? S AU=CHEN,?
? S AU=JONES?
         S AU=JONES?
         >800 TERMS; RESPECIFY
? S AU=CHEN,H.L
          6      0 AU=CHEN,H.L
? S AU=F?FE,W.I
         S AU=F?FE,W.I
         >8000 TERM LOOKUP; RESPECIFY
? S HYDROGEN8W9FLUORIDE
? S HYDROGEN8(
          7      0 HYDROGEN8(
? S HYDROGEN(W)FLUORIDE
          8    530 HYDROGEN(W)FLUORIDE
? S LASERS
          9  11805 LASERS
? C 8 AND 9
         10    312 8 AND 9
? S AU=CHEN, H.L
         11      0 AU=CHEN, H.L
? S FIFE,W.I
         12      0 FIFE,W.I
? S AU=FIFE,W.I
         13      0 AU=FIFE,W.I
? S AU=FYFE,W.I
         14      0 AU=FYFE,W.I
? S AU=F?FE,W.I
         S AU=F?FE,W.I
         >8000 TERM LOOKUP; RESPECIFY
? E F?FE
REF  INDEX-TERM                TYPE ITEMS RT
E1   F-94C AIRCRAFT-----------         1
E2   F,H----------------------         1
E3   F,I----------------------         1
E4   F,K----------------------         1
E5   F,RB---------------------         1
E6  -F?FE---------------------
E7   FA-----------------------       106
E8   FA ROUTE 2591------------         1
E9   FA 253M PRIMERS----------         1
E10  FA 956 PRIMING MIXTURE--          1
E11  FA-BDE POLYMER-----------         2
E12  FA-5144 ASR ANTENNA
        SYSTEM----------------         1
E13  FAA----------------------       549
E14  FAA BASIC FLIGHT
        INSPECTION------------         1
E15  FAA DESCRIPTORS----------         1
E16
```

Case 2   Test Performance, p. 2

Attempt to resolve author problems fail; subject SELECTs successful

```
? S AU=FYFE?
          15    26 AU=FYFE?
? S AU=FIFE?
          16    49 AU=FIFE?
? C 15 AND10
          17     1  15 AND10
? T 17/6/1
17/6/1
AD-A015 130/8ST   NTIS Prices: PC A05/MF A01
  Fluorine Dissociation Study for Pulsed Chemical Lasers
  Jan 75   86p

? ST 17/5/1


        18     0 T 17/5/1
? T 17/5/1
17/5/1
Fluorine Dissociation Study for Pulsed Chemical Lasers

Avco  Everett  Research Lab Inc Everett Mass*Office of Naval Research,
Arlington, Va.   (048450)

Final technical rept. 1 May-31 Dec 74
AUTHOR: Chen, H. L.; Trainor, D. W.; Fyfe, W. I.; Center, R. E.
C5353H2     Fld: 20E, 7D, 46C, 99F   GRAI7524
Jan 75   86p
Contract: N00014-74-C-0367
Monitor: 18

Abstract:  This  report  presents  experimental  results  for  the
dissociation  of  F2  in  electron  -beam  sustained  discharges.  Two
diagnostic techniques were developed for the measurement of  transient
F atom concentration with sensitivity as high as F/F2 = or >  0.00001.
The sustainer enhancement factor derived  from  these  experiments  is
small,  <2,  and  appears  to be mainly due to dissociation of F2 by
collisions with energetic ions.  Measurements were also  made  of
                                                         spectra, Reco
ion reactions; Sulfur compounds

Identifiers: *Hydrogen fluoride lasers, Sulfur hexafluoride, NTISDODN

AD-A015 130/8ST   NTIS Prices: PC A05/MF A01
```

Case 2   Test Performance, p. 3

Here the author SELECT problem is neatly
resolved: FIFE? and FYFE? are used;
apparent assumption that they were not both
needed to triangulate the target document.

```
? S TETE
          19     4 TETE
? S TETRA???ORIDE
          20   483 TETRA???ORIDE
? S LASER?
          21 15333 LASER?
? SLASERS
          22 11805 LASERS
? C 20 NOT 22
          23   453 20 NOT 22
? T 23/6/1
23/6/1
AD-838 297/0ST   NTIS Prices: PC A06/MF A01
  Sorption Properties of Activated Carbon
  Aug 68   105p

? T 23/5/2
23/5/2
Pitting  Corrosion  and  Surface  Chemical  Properties of a Thin Oxide
Layer on Anodized Aluminum Alloys

Air Force Materials Lab Wright-Patterson AFB OH   (012320)

Final rept. Jun 77-May 78
AUTHOR: McDevitt, Neil T.; Baun, William L.; Solomon, James S.
F0374K1    Fld: 11F, 71N, 71G   GRAI7906
Sep 78   29p
Rept No: AFML-TR-78-128
Project: 2419
Task: 02
Monitor: 18

Abstract: Aluminum alloys, 2024 and 7075, containing copper were found
to react readily with a mixture of methanol and carbon  tetrachloride.
A  homogeneous  oxide  film  covering  these metals does not allow the
solution to attack the  alloy.  Pitting  corrosion  occurs  when  the
alloying  constituents  cause  defect  structures  in  the oxide film.
Copper was detected in the pits of all the specimens studied. (Author)

Descriptors: *Aluminum alloys, *Corrosion, Pitting, Surface properties
, Thin films,  Oxides,  Anodic coatings,  Auger electron spectroscopy,
Ions,  Scattering,  Phosphoric  acids,  Mass spectroscopy,  Copper,
Carbinols, Carbon tetrachloride

Identifiers: Aluminum alloy 2024, Aluminum alloy 7075, NTISDODXA

AD-A061 034/5ST   NTIS Prices: PC A03/MF A01
```

Case 2 Test Performance, p. 4

Q3 Complete; use of internal character
substitution and NOT logic

```
? DS
           DS @
           Invalid argument
? DISPLAY SETES
           DISPLAY SETES
           Set-number syntax error
? DISPLAY SETS
Set Items Description
  1     4 MOTIVATION(W)THEORY/TI
  2   720 INDUSTRIAL TRAINING
  3     0 1 AND2
  4     1  1 AND 2
  5     0 AU=CHEN,H?
  6     0 AU=CHEN,H.L
  7     0 HYDROGEN8(
  8   530 HYDROGEN(W)FLUORIDE
  9 11805 LASERS
 10   312  8 AND 9
 11     0 AU=CHEN, H.L
 12     0 FIFE,W.I
 13     0 AU=FIFE,W.I
 14     0 AU=FYFE,W.I
 15    26 AU=FYFE?
 16    49 AU=FIFE?
 17     1  15 AND10
 18     0 T 17/5/1
 19     4 TETE
 20   483 TETRA???ORIDE
 21 15333 LASER?
 22 11805 LASERS
 23   453  20 NOT 22
? END=
          16apr79 15:00:32 User7609
  $5.36   0.357 Hrs File6 9 Descriptors
? LOGOFF
          16apr79 15:00:46 User7609
  $0.03   0.005 Hrs File6

LOGOFF 15:00:50


TC>  dropped by host system


please log in: ?~w»?~∂N~~L7Lx2WH[AD(.s!5B?R≠MV≠!s?%G)Q%%~>)u(?↑∂T$vz((XDLZFMLG(x
ES~-8$)!0<YamH~zv0mx~wW
```

Case 2   Test Performance, p. 5

Review of set history, and closing search

Case 3 as reviewed here (see User History appendix, 134057,261141) is a graduate research assistant in the Chemistry Department. He, of course, used Chemical Abstracts in his work; his interest in using TRAINER was primarily preliminary to later study of the chemical files in the DIALOG system. The question set used was the set described for Case 2.

Login gave minimal difficulty as DIALOG password was entered the first time TYMNET request PASSWORD:

User 3 chose to work on question 2 first, defeating our intent that question 1, a much easier search, should make the initial use of DIALOG a quick and unequivocally successful one.

He used BEGIN6 to bring up NTIS, and E'd TRAIN?R to get viewing of all forms of the first author name. He did not specify AU= as prefix; this was evidently caused by his confusing Train?r, D.W., with TRAINER, because his next step was to S TRAINER/TI. He interrupted the E listing (TRAIN to ?, with TRAIN?R in E6 between TRAIN-TO-CAR COLLISIONS and TRAINABILITY) when it was evident to him that it was not helpful (see his note in margin, transcript, p. 1).

Next he entered S A=Chen?, cancelled the entry <Break Key>, and entered E AU=CHEN? CHEN? was included at position E-6, following CHEN, ZENG FU. He P'd for more entries, looking for CHEN, H.L., <BREAK>--stopped the display when he realized a better approach. After a typing error, he made a more specific request: E AU=CHEN, H.L. The spacing error (H.L.) was close enough so that he could see the correct form of CHEN, H. L. He did not select from the E display, but went on to choose: S LASER?, S HYDROGEN FLUORIDE, the two subject aspects of the question. He then attempted to SELECT author H.L. Chen, experienced difficulty with spacing of the initials, but finally a third attempt was correct. He tried briefly for author FIFE/FYFE but gave up, assuming (correctly) that one author set would suffice to isolate the desired document.

For the third question, he recognized the usefulness of multiple internal character substitution, but miscounted characters; the question caused difficulty also because it violated his understanding: he rejected the notion of "tetra???oride" as an independent term for searching (see his notes on transcript) because it could not be considered to be independent as a chemical entity. In later review of his transcript, he saw the spelling error, but for the immediate situation he substituted his own question (LASERS NOT HYDROGEN FLUORIDE LASERS) to demonstrate his knowledge of the NOT operator.

He changed files (.FILE1) to tackle the first, to him less interesting, question. The problem of the multiword phrase from a title was handled after an initial attempt which failed; the S MOTIVATION THEORY/TI was immediately revised to two separate SELECTS and the intended item was retrieved, although he expressed doubt (see transcript p. 4).

Case 3 then returned to question 2, to study the problem of author searching; using character substitution and EXPAND with AU. The author name contained a misspelling, unfortunately not noticed; which prevented his resolving the author problem, whereupon he reviewed his set history and logged off. (Note that he had answered question 2 correctly already--see transcript, p. 3.)

66

Capabilities Demonstrated in Online "Test," Case 3

Command Name	Use(Form of Entry: Abbreviation, Spacing)
LRS; LOCKHEED	no problem
DIALOG PASSWORD	one fumble (typo)
BEGIN	BEGIN6 (no space)
.FILE	.FILE1 (no space)
?FILES	(not used)
EXPAND	E (with space)
/TI	/TI
/AU	E AU = (with space)
PAGE	P
SELECT	S (with space)
(W)	(not used)
/TI	/TI
AU=	AU=
Range of E no's	(not used)
COMBINE	C(no space)
NOT,AND,OR	*, -
Set range shortcut	C3-4/*
TYPE	T(no space)
Set no. only	(not used)
Set/format	(not used)
Set/format/item	T 22/5/1
PRINT	(not used)
END	(not used)
DISPLAY SETS	D S
root search	E AU=CHEN?LASER?
Character substitution	single & multiple
LOGOFF	LOGOFF
Interrupt	↑O, <Break>

```
.∂
dRzNRe=TxDkomdBR%9ZAMeGAUDzDeA?}@@Ee++!!!!M TXpID  {Y1K=RK∂XFX+
                                     L}\?=R[z?LUe(5SXYD.e1[X9}<-Dcs3=wL(.AT1!LG
eJ]zv=DX~R2eSPD/TIzN!
PLEASE TYPE YOUR TERMINAL IDENTIFIER
063-04--
PLEASE LOG IN:




E

ERROR, TYPE USER NAME: LRS

PASSWORD:
TC>  HOST IS ONLINE


BAD PASSWORD  9:20:01

ENTER YOUR DIALOG PASSWORD
[redacted]  LOGON File1 Mon 7May79 9:20:22


FOUR NEW FILES NOW SEARCHABLE AND HALF-
R FREE CONNECT TIME ON NATL NEWSPAPER
DEX (FILE 111) DURING MAY. SEE ?NEWS
 BEGIN6
          7May79 9:20:44 User7609
$0.12  0.008 Hrs File1*
Le6:NTIS 64-79/ISS09
Copr. NTIS)
          Set Items Description (+=OR;*=AND;-=NOT)
        --- ----- ------------------------------
E TRAIN?R
Ref  Index-term             Type Items RT
  TRAIN TELECOMMUNICATION-       1
   TRAIN TO CAR COLLISIONS-      1
   TRAIN TO SCHOOLBUS
      COLLISIONS------------      1
   TRAIN TO TRUCK
      COLLISIONS------------      1
   TRAIN-TO-CAR COLLISIONS-      1
  -TRAIN?R-----------------
   TRAINABILITY------------      4
   TRAINABLE---------------     13
   TRAINABLE RETARDATES----      1
0  TRAINED-----------------     60
1  TRAINED ANIMALS---------      1
2  TRAINED PERSONNEL
      REQUIREMENTS----------      1
3  TRAINEE-----------------     31
4  TRAINEE PREFERENCES-----      1
5  TRAINEE'S---------------      1
6  TRAINEES--------------□
7 *
```

i was unprepared to
see so many terms when
I expanded Train?r

```
          □
     Invalid command code
? s trai er/ti
          1      0 S TRAINER/TI
 s train?r/ti
          2      0 TRAIN?R/TI
? s au=chen?
? E au=chen?
[illegible]  Index-term           Type Items RT
   A[illegible]CHEN, YUNG-SEN---------      3
   AU=[illegible] Z.------------------      1
   AU=CHEN, Z. P.-----------            2
   AU=CHEN, ZEN---------------          1
   AU=CHEN, ZENG-FU----------           1
  -AU=CHEN?------------------
   AU=CHENAKAL, V. L.-------            1
   AU=CHENAL, J. C.---------            1
   AU=CHENAL, JEAN-CLAUDE--             1
0  AU=CHENARD, JOHN H.------            1
1  AU=CHENATTE, EUGENE R.--             1
2  AU=CHENAULT, BARBARA----             1
3  AU=CHENAULT, D. M.-------            1
4  AU=CHENAULT, DAVID
      WALLER II---------------          1
5  AU=CHENAULT, R.-----------           1
6  AU=CHENAULT, ROGER-------            1
7  AU=CHENAULT, WILLIAM W.-            18
8  AU=CHENAUSKY, PETER P.--             3
9  AU=CHENAVAS, P.----------            1
                                      -more-
 p
Ref  Index-term              Type Items RT
  AU=CHENCHANNA, P.--------         3
1  AU=CHENCHAYYA, B. T.----             1
2  AU=CHENCHOBROM, PHUNSI--             1
3  AU=CHENEAU, GILBERT-----             1
4  AU=CHENEBAULT, P.--------           10
5  AU=CHENEBAULT, PIERRE---             2
6  AU=CHENERY, HOLLIS B.---             1
7  AU=CHENERY, MARY FAETH--             2
8  AU=CHENERY, P. J.--------            2
9  AU=CHENETTE, E. R.-------            1
0  AU=CHENETTE, EUGENE R.--            11
1  AU=CHENEVEAU, CHARLES---             1
2  AU=CHENEVERT, M. L.------            1
3  AU=CHENEVEY, EDWARD C.--             1
4  AU=CHENEY, BARBARA------             1
5  AU=CHENEY, CHARLES C.---             1
6  A□
```

Case 3   Test Performance, p. 2

```
? E AU=CHEN, H.?
          OE AU=CHEN, H.?
        INVALID COMMAND CODE
 E AU=CHEN, H.L.
REF  INDEX-TERM              TYPE ITEMS RT
   AU=CHEN, H. L.----------        3
   AU=CHEN, H. M.----------        1
   AU=CHEN, H. M. S.-------        1
   AU=CHEN, H. S.----------       12
   AU=CHEN, H. W.----------        1
  -AU=CHEN, H.L.-----------
   AU=CHEN, HAO-CHIA-------        1
   AU=CHEN, HAO-LIN--------        4
   AU=CHEN, HENRY----------        1
0  AU=CHEN, HENRY C. K.----        1
1  AU=CHEN, HOLLIS H. C.---        1
2  AU=CHEN, HONG-WEN-------        1
3  AU=CHEN, HORNG-YIH------        1
4  AU=CHEN, HSAO-HSIN------        3
5  AU=CHEN, HSI-SHU--------        2
6  AU=CHEN, HSO
 S LASER?
          OS LASER?
          INVALID COMMAND CODE
 S LASER?
           3 15400 LASER?
 S HYDROGEN FLUORIDE
           4   321 HYDROGEN FLUORIDE
 S AU=CHEN, H.L.
           5     0 AU=CHEN, H.L.
 S AU=CHEN,H.L./
           6     0 AU=CHEN,H.L./
 S AU=CHEN, H. L.
           7     3 AU=CHEN, H. L.
 S AU=FI
           8     0 AU=FI
? S AU=FIFE, W. I.
           9     0 AU=FIFE, W. I.
? C3-4/*
          10   131 3-4/*
? C7*10
          11     1 7*10
? T11/6/1
11/6/1
AD-A015 130/8ST   NTIS PRICES: PC A05/MF A01
LUORINE DISSOCIATION STUDY FOR PULSED CHEMICAL LASERS
AN 75   86P

? S TETRA???UORIDE
          12     0 TETRA???UORIDE
 S CARBON TETRA???UORIDE
          13     0 CARBON TETRA???UORIDE
 S HYDROGEN FLUORIDE
          14   321 HYDROGEN FLUORIDE
 C14-3
          15   190 14-3
? .FILE1
        7MAY79 9:38:40 USER7609
$4.50  0.300 HRS FILE6 4 DESCRIPTORS
```

answer to a number [illegible]

mistake should not have been here

There is no such thing as tetrafluoride

used hydrogen fluoride — not laser

#3

```
Le1*:ERIC 66-79/FEB
? s industrial training
          16   722 INDUSTRIAL TRAINING  (TRAINING FOR EMPLOYEES CONDU
s motivation theory/ti
          17     0 MOTIVATION THEORY/TI
```

← There is no phrase

```
-s motivation
          18  9851 MOTIVATION
 s motivation/ti
          19   833 MOTIVATION/TI
 s theory/ti
          20  2597 THEORY/TI
```

?

```
 c 19*20
          21    27  19*20
? c16*21
          22     1 16*21
? t22/5/1
22/5/1
EJ165383  CE506636
 A Trainer's Tour through the Motivation Theory Jungle
are, Frederick A., Jr.
 Training, 14, 7, 31-32    Jul 77
Reprint Available (See p. vii): UMI
Discusses  various conflicting theories of motivation for industrial
ers;  most  recently  organizational  behavior  modification  and
ral cognitive approaches;  stating that trainers should avoid both
ism and isolationism in their management philosophies. (MF)
scriptors:     *Personnel   Management/     *Industrial    Training/
ivation/ *Work Attitudes/ *Behavior Theories/ Theories/  Cognitive
e/ Behavior Change
```

not quite what you wanted

#1

```
? .file6
         7may79 9:42:35 User7609
$1.01  0.067 Hrs File1* 4 Descriptors
Le6:NTIS 64-79/ISS09
Copr. NTIS)
? s fyfe, w.i.
          23     0 FYFE, W.I.
ssab?fe, w. i.
                S F?FE, W. I.
       >8000 term lookup; respecify
 s au=f?fe, w. i.
          24     0 AU=S AU=F?FE, W. I.
 s au=f?fe, w.i.
          S AU=F?FE, W.I.
         >8000 term lookup; respecify
 e au=f?fe,W>
 e au=f?fe, w. f.
Ref  Index-term             Type Items RT
   AU=EZZ, S. Y.-----------       1
   AU=EZZARD, HENRY SPEER
     JR--------------------       1
   AU=EZZARD, RICHARD D.---       1
   AU=EZZAT, E.------------       2
   AU=F, SCOTT-------------       1
  -AU=F?FE, W. F.----------
   AU=F'GEPPERT, ERWIN-----       4
   AU=FA, FAN SHUN---------       1
   AU=FA, WANG CHU---------       1
0  AU=FAALAND, BRUCE-------       3
1  AU=FAALAND, BRUCE H.----       3
2  AU=FAAS, FRED H.--------       1
3  AU=FAAS, LINDA----------       1
```

71

```
4  AU=FAAS, LINDA F.-------        1
5  AU=FAAS, RICHARD W.-----        4
6  AU=FAASS, E.------------        2
7  AU=FAASSE-VAN PEER, M.
     J. J. A.--------------        1
8  AU=FAATZ, W. C.---------        1
                                 -MORE-
 S AU=TRAINT?R?
          25      0 AU=TRAINT?R?
? S TRAINER?
          26    371 TRAINER?
? S TRAIN?R
          27    208 TRAIN?R
 DS
Set Items Description
 1      0 S TRAINER/TI
 2      0 TRAIN?R/TI
 3 15400 LASER?
 4    321 HYDROGEN FLUORIDE
5      0 AU=CHEN, H.L.
 6      0 AU=CHEN,H.L./
 7     3 AU=CHEN, H. L.
8      0 AU=FI
 9      0 AU=FIFE, W. I.
0    131 3-4/*
11      1 7*10
12      0 TETRA???UORIDE
13      0 CARBON TETRA???UORIDE
4    321 HYDROGEN FLUORIDE
5    190 14-3
16    722 INDUSTRIAL TRAINING
7      0 MOTIVATION THEORY/TI
8  9851 MOTIVATION
19    833 MOTIVATION/TI
20   2597 THEORY/TI
21     27  19*20
22      1 16*21
23      0 FYFE, W.I.
24      0 AU=S AU=F?FE, W. I.
5     0 AU=TRAINT?R?
26    371 TRAINER?
27    208 TRAIN?R
? c27*5
          28      0 27*5
? LOGOFF
         7MAY79 9:50:06 User7609
  $1.91   0.127 Hrs File6 2 Descriptors

LOGOFF  9:50:11

TC>  DROPPED BY HOST SYSTEM
```

Note:

1 combined Trainer (Train?r) and (hydrogen fluoride and lasers)

But there is nothing lsted.

Case 3   Test Performance, p. 5

Case 4 (User History, 134057,304304), a student in the Chemistry Department, is unusual in that he presented himself for testing after completing only Module 3, the brief overview of DIALOG searching and several uses of the DIALOG emulator. His stated interest was in getting useful references, only; he was not interested in the process per se.

The question set used was the same set used for Case 2. The student requested help several times; could not have resolved the problem of last name first in the author search without it. Other places where help was requested: interrupting display after ?FILES, /TI qualifier.

Most of his difficulties he resolved for himself, using the TRAINER Manual; he did succeed in retrieving the "target" documents for all questions. Thus we have validated our choice of commands for Module 3 as adequate for searching; added practice and capabilities of Modules 4-7 are not strictly necessary, at least for the "test" questions. His time online was much longer than the other trainees tested, however: 56 minutes.

Capabilities Demonstrated in Online "Test," Case 4

Command Name	Use(Form of Entry: Abbreviation, Spacing)
<CR><CR><CR>	no problem
C 415 20	brief fumble with spacing
BEGIN	B1
.FILE	(incorrectly)
?FILES	?FILES (no space)
EXPAND	E (with space)
AU=	(not used)
/TI	(not used)
PAGE	(not used)
SELECT	S (with space)
(W)	(W) (see text)
AU=	SAU= (see text)
/TI	TERM(W)TERM/TI(with help, see text)
COMBINE	C (space and no space)
AND,OR,NOT	AND,NOT,OR
Set range shortcut	(not used)
TYPE	T(no space)
Set no. only	T10
Set/format	(not used)
Set/format/item(s)	T18/5/1
PRINT	(not used)
END	(not used)
DISPLAY SETS	(not used)
root search	SAU=TRAINER,?
Character substitution	(not used)
LOGOFF	LOGOFF

```
TELENET
412 8D

TERMINAL=

@c415 20
 ?

@[redacted]
 ?

@




TELENET
412 8F

TERMINAL=

@c 415 20


415 20 CONNECTED


ENTER YOUR DIALOG PASSWORD
[redacted]
[redacted]  LOGON File1 Tue 29May79 9:59:02


FILE 21 IS OFFLINE .
HALF-HOUR FREE CONNECT TIME ON NATIONAL
NEWSPAPER INDEX (FILE 111) DURING MAY.
WELDASEARCH (FILE 99)  NOW SEARCHABLE
U.S.MEMORIAL DAY SCHEDULE MONDAY MAY 28.
SEE ?NEWS.
? ?files

Accessible files:
    1* ERIC 66-79/FEB
    5  BIOSIS PREVIEWS 74-79/APR
    6  NTIS 64-79/ISS12
    7  SOCIAL SCISEARCH 72-79/WK16
    8  COMPENDEX 70-79/APR
    9  AIM/ARM 67-76
   10  AGRICOLA 70-78/DEC
   11  PSYCH ABS 67-79/MAR
   12  INSPEC 69-77
   13  INSPEC 78-79/ISS10
   14  ISMEC-MECH ENGR 73-79/JUN
   15  ABI/INFORM 71-79/APR
   16  PROMT 72-79/MAY
   17  PTS WEEKLY 79/MAY26
   18  F & S INDEXES 76-79/APR
   19  CHEM IND NOTES 76-79/ISS22
   20  FEDERAL INDEX 76-79/FEB
   21  (*offline*)
   22  EIS PLANTS(TYPES $0.50 EA.) MAY79
   26  FOUNDATION DIRECTORY 1979 ED.
   27  FOUNDATION GRANTS 73-79/MAR
   28  OCEANIC ABS 64-77
   32  METADEX 66-79/FEB
   33  WORLD ALUMINUM ABS 68-78/DEC
   34  SCISEARCH 78-79/WK14
   35  COMP DISSERT ABS 1861-1979/MAY
   37  SOCIOLOGICAL ABS 63-79/ISS01
   38  AMERICA: HIST & LIFE 63-77/ISS04
   39  HISTORICAL ABS 73-77/ISS03
   40  ENVIROLINE 71-79/FEB
   41  POLLUTION ABS 70-79/MAR
   42  PHARM NEWS INDEX 75-77
   45  APTIC 66-78/OCT
   47  MAGAZINE INDEX 77-79/MAY
   48  PIRA 75-79/APR
   49  PAIS INTERNATIONAL 76-79/FEB  (Copr. PAIS Inc.)
   50  CAB ABS 72-79/FEB
   51  FSTA 69-79/FEB
   54  ECER/EXCEP CHILD 66-79/JAN
   55  BIOSIS PREVIEWS 69-73
   56  ART MODERN 74-78
   58  GEOARCHIVE 74-79/FEB
   59  FROST & SULLIVAN DM2 75-78/ISS02
   60  USDA/CRIS 75-79/MAR
   62  SPIN 75-79/APR
   63  MRIS ABSTRACTS 70-79/FEB
   64  CHILD ABUSE AND NEGLECT
   65  SSIE CURRENT RESEARCH 75-79/MAR
   66  GPO MONTHLY CATALOG JUL76-79/APR
   67  WORLD TEXTILES 70-79/MAR
   68  EPB 74-79/MAR
   69  ENERGYLINE 71-79/FEB
   71  MLA Intl. Bibliography 76-77
   72  EXCERPTA MEDICA 75-78/ISS51
   7
? motivation theory

           MOTIVATION THEORY
           Target-terminal syntax error
? eric

Ref  Index-term               Type Items RT
E1    RIBONUCLEIC ACID--------        2
E2    RIBONUCLEOPROTEIN-------        1
E3    RIBOSOME----------------        1
E4    RIBOSOMES---------------        1
E5    RIBOVICH----------------        1
E6   -RIC---------------------        5
E7    RICA--------------------       43
E8    RICA'S------------------        1
E9    RICAHRD-----------------        1
E10   RICAN-------------------      717
E11   RICAN'S-----------------        5
```

```
E12  RICANS-------------------      810
E13  RICARDO------------------        8
E14  RICCI--------------------        1
E15  RICCIO-------------------        5
E16  RICCIUTI-----------------        2
E17  RICE---------------------       76
E18  RICE (SHER)--------------        1
E19  RICE ECONOMY-------------        1
E20  RICE UNIVERSITY----------        1
                                   -more-
? ntis

         NTIS
         Invalid command code
? file eric

         FILE ERIC
         Invalid command code
? b1

        29may79 10:06:55 User7612
  $2.00  0.133 Hrs File1+
File1+:ERIC 66-79/FEB
        Set Items Description (+=OR;*=AND;-=NOT)
        --- ----- -----------------------------
?.file1

         FILE1
         Invalid command code
? file1

         FILE1
         Invalid command code
? motivation theory

         MOTIVATION THEORY
         Target-terminal syntax error
? s motivation theory

          1      0 MOTIVATION THEORY
? e motivation theory

Ref  Index-term               Type Items RT
E1   MOTIVATION CHECK SHEET--        1
E2   MOTIVATION CUES---------        1
E3   MOTIVATION FACTORS------        1  1
E4   MOTIVATION PROFILE------        1
E5   MOTIVATION TECHNIQUES---      891  4
E6  -MOTIVATION THEORY-------
E7   MOTIVATION'S------------        1
E8   MOTIVATIONAL------------     1014
E9   MOTIVATIONAL ANALYSIS
       TEST------------------        2
E10  MOTIVATIONAL NEEDS
       INVENTORY-------------        1
E11  MOTIVATIONALLY----------        6
E12  MOTIVATIONS-------------      352
```

```
E13  MOTIVATIONSARTEN--------        1
E14  MOTIVATIONSSTRUKTUR-----        1
E15  MOTIVATIVE--------------        3
E16  MOTIVATN----------------        1
E17  MOTIVATON---------------        1
E18  MOTIVATOR---------------       50
                                   -MORE-
? S MOTIVATION

            2  9851 MOTIVATION
? S THEORY

            3 14408 THEORY
? C2AND3

            4   590 2AND3
? TRAINING

           TRAINING
           SET-NUMBER SYNTAX ERROR
? S TRAINING

            5 40994 TRAINING  (SYSTEMATIC EDUCATIVE PROCESS BY WHICH O
? S INDUSTRIAL

            6  8001 INDUSTRIAL
? C 5AND6

            7  2475  5AND6
? C4AND7

            8     9 4AND7
? S MOTIVATION(W)THEORY/TI

            9     4 MOTIVATION(W)THEORY/TI
? C7AND9

           10     1 7AND9
? T10

10/2/1
EJ165383  CE506636
  A TRAINER'S TOUR THROUGH THE MOTIVATION THEORY JUNGLE
  WARE, FREDERICK A., JR.
  TRAINING, 14, 7, 31-32    JUL 77
  REPRINT AVAILABLE (SEE P. VII): UMI
  DESCRIPTORS:     *PERSONNEL   MANAGEMENT/    *INDUSTRIAL   TRAINING/
*MOTIVATION/ *WORK ATTITUDES/ *BEHAVIOR THEORIES/ THEORIES/  COGNITIVE
STYLE/ BEHAVIOR CHANGE
```

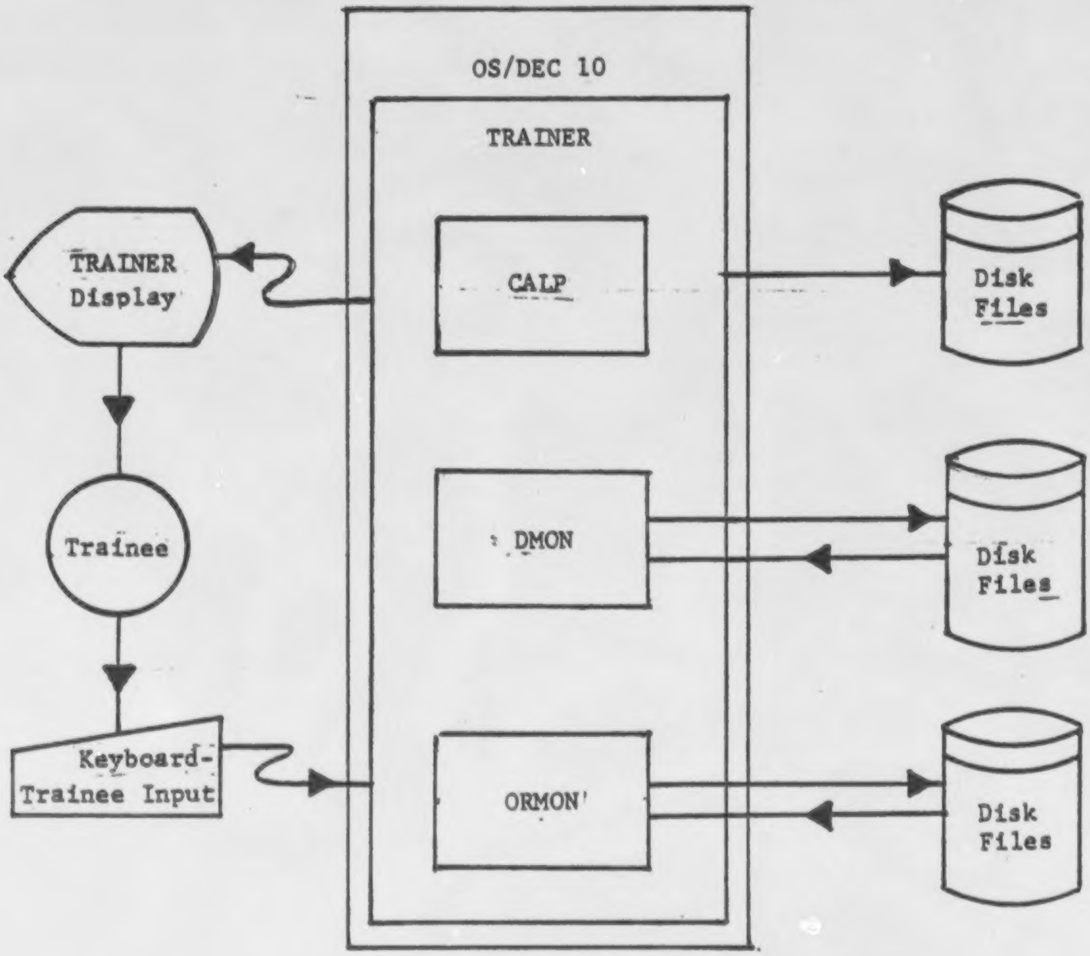
```
? sau=d.w.trainer

             11      0 AU=D.W.TRAINER
? sau=h.l.chen

             12      0 AU=H.L.CHEN
? sau=w.i.fife

             13      0 AU=W.I.FIFE
? c11and12and13

             14      0 11AND12AND13
? sau=trainer,d.w

             15      0 AU=TRAINER,D.W
? b6

          29may79 10:29:09 User7612
  $5.58   0.372 Hrs File1* 6 Descriptors
File6:NTIS 64-79/ISS12
(Copr. NTIS)
          Set Items Description (+=OR;*=AND;-=NOT)
          --- ----- ------------------------------
? sau=trainer,d.w

              1      0 AU=TRAINER,D.W
? sau=trainer, ?

              2     20 AU=TRAINER, ?
? sau=chen, ?

              3   1226 AU=CHEN, ?
? shydrogen fluoride lasers

              4    247 HYDROGEN FLUORIDE LASERS
? c2and3

              5      0 2AND3
? sau=trainor, ?

              6     56 AU=TRAINOR, ?
? c6and3

              7      1 6AND3
? c7and4

              8      1 7AND4
? t8

8/2/1
AD-A015 130/8ST   NTIS Prices: PC A05/MF A01

Fluorine Dissociation Study for Pulsed Chemical Lasers

Avco  Everett  Research Lab Inc Everett Mass*Office of Naval Research,
Arlington, Va.    (048450)

AUTHOR: Chen, H. L.; Trainor, D. W.; Fyfe, W. I.; Center, R. E.
Final technical rept. 1 May-31 Dec 74
C5353H2    Fld: 20E, 7D, 46C, 99F    GRAI7524
```

```
Jan 75   86p
Contract: N00014-74-C-0367
Monitor: 18

Descriptors: *Chemical lasers, *Fluorine, *Dissociation, Hydrogen
fluoride, Electron beams, Electric discharges, Reaction kinetics,
Collisions, Energy transfer, Test methods, Measurement, Additives,
Carbon tetrafluoride, Gas ionization, Helium, Argon, Vibrational
spectra, Recombination reactions, Sulfur compounds

Identifiers: *Hydrogen fluoride lasers, Sulfur hexafluoride, NTISDODN

? stetrachloride compounds

          9      0 TETRACHLORIDE COMPOUNDS
? s tetrachloride

         10    340 TETRACHLORIDE
? compounds

         COMPOUNDS
         Set-number syntax error
? s compounds

         11  36853 COMPOUNDS
? c11and10

         12    138 11AND10
? s tetrafluoride

         13    160 TETRAFLUORIDE
? s12or13

         14      0 12OR13
?






  c12or13
         15    293 12OR13
? slaser

         16  10229 LASER
? c15and16

         17     11 15AND16
? c15not17

         18    282 15NOT17
? t18/5/1

18/5/1
Ambient Water Quality Criteria: Carbon Tetrachloride

Environmental Protection Agency, Washington, DC. Criteria and
Standards Div.
F0802B3    Fld: 6T, 6F, 8A, 57Y*, 57H, 68G*, 68D, 47D   GRAI7910
```

```
1978    131p        -
Monitor: 18
*Portions of this document are not fully legible.*

Abstract: Section 304(a)  of the Clean Water Act (33 U.S.C.  1314(a)),
requires  EPA  to  publish  and  periodically  update  water  quality
criteria.  These  criteria  are  to  reflect  the  latest  scientific
knowledge  on  the identifiable effects of pollutants on public health
and welfare, aquatic life, and recreation.  This report presents water
quality  criteria for carbon tetrachloride.  It presents concentration
criteria for the protection of fresh water and saltwater aquatic life.
It presents 'safe'  concentrations for humans,  and  in  the  case  of
suspect  or  proven  carcinogens,  gives various levels of incremental
cancer risk. A section 304(a) water quality criterion is a qualitative
or quantitative estimate of the concentration of a  water  constituent
or pollutant in ambient waters which, when not exceeded, will ensure a
water  quality sufficient to protect a specified water use.  Under the
Act a criterion is a scientific entity,  based  solely  on  data  and
scientific judgment. It does not reflect considerations of economic or
technological  feasibility  nor  is it a water quality standard and in
itself has no regulatory effect.

Descriptors:  *Water quality,   *Toxicology,   *Carbon  tetrachloride,
Chlorine aliphatic compounds, Chloroalkanes, Criteria, Toxicity, Water
pollution,   Aquatic  biology,   Marine biology,  Fresh water biology,
Concentration(Composition),  Exposure,  Carcinogens,   Public  health,
Residues, Experimental data

Identifiers:  *Water  pollution  effects(Humans),  *Water  pollution
effects(Animals),  *Toxic substances,  CAS 56-23-5,  Clean Water  Act,
Environmental health,  Maximum permissible exposure,  Bioaccumulation,
NTISEPAOWP

PB-292 424/9ST   NTIS Prices: PC A07/MF A01

? logoff

          29may79 10:55:12 User7612
  $6.54   0.436 Hrs File6 8 Descriptors

LOGOFF 10:55:13


415 20 DISCONNECTED 0:56:52 230 58

088*1080+19X98K>?868T2&8BAAAW8m8&m0P?F(Tq?
```

81

TRAINER Programs: Conceptual Overview



TRAINER is a CATALYST/PIL program that monitors execution of the computer assisted learning modules and of the practice work in the emulated DIALOG^{TM} and ORBIT^{TM} systems.

It also takes "snapshots" of the user at each decision point (change between modules or segments within modules). The USR.STA program writes these data onto a save file; they are later processed to produce individual user histories (see appendix).

TRAINER Programs

Overview

There are currently three separable systems operating under the DEC 10 OS:*

1. Computer Assisted Learning and Practice (CALP) Modules
2. DIALOG^{TM} Emulator
3. ORBIT^{TM} Emulator

Two series of disk files are maintained for the two emulators, to accommodate the differing indexing practices of the two services.

The TRAINER is entered by loading the CATALYST processor, using the system command:

```
R CTLYST
```

and then specifying TRAINER at disk location 134057,120121 when CATALYST prompts for LESSON:SECTION[P,PN]:

```
LESSON:SECTION[P,PN]: TRAINER[134057,120121]
```

The CALP Modules are entered by specifying a Module number, 1-7, when prompted by TRAINER:

```
Enter Module Number or letter =>1
```

The DIALOG^{TM} and ORBIT^{TM} emulators are entered by choosing Modules A or B respectively after the above commands have been executed, or they may be entered directly by issuing this command, when in Monitor mode:

```
RUN DIALOG[134057,120121]
```

or

```
RUN ORBIT[134057,120121]
```

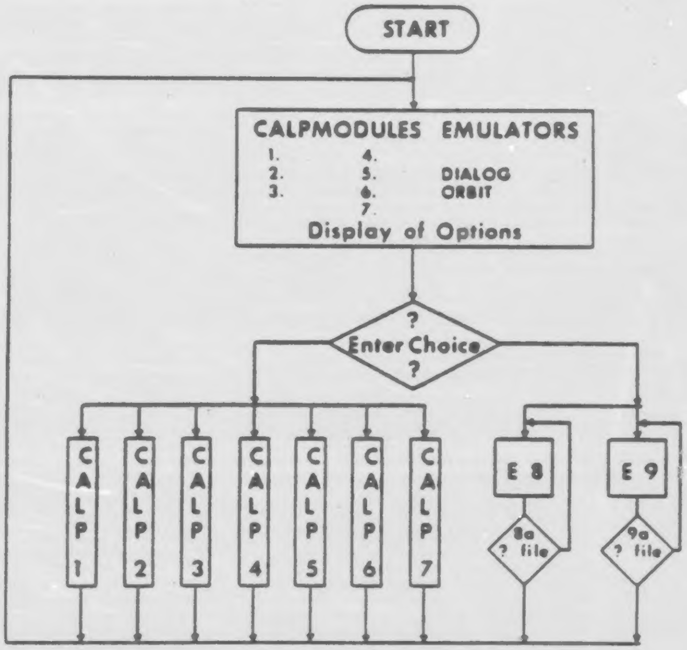
---

*See "TRAINER Presentation Package" for descriptions of TRAINER implementations in other computing environments.

CATALYST Programs

The original development of the seven tutorial modules was done in CATALYST, as noted in the earlier section, "Design of TRAINER." A CATALYST Primer is included in the appendices to this report; for users of TRAINER programs who have implemented the FORTRAN versions of the tutorial modules. Program changes and additions can be made following CATALYST conventions. Examples of CATALYST programs are given in the appendices to this report; the programs are easily understood, using the Primer, and program revision or augmentation to meet specific needs can be readily accomplished.

The CATRAN program, described below and in appended documents, can then be used to create new FORTRAN versions for use with the basic TRAINER package or in other contexts if desired.



TRAINING MODULES

GENERAL SYSTEM FLOW

CATRAN: Generating FORTRAN Code for CATALYST Modules

The language used in developing the tutorial modules was CATALYST/PIL (see appendices). A CATALYST to FORTRAN translating program has been developed by the Project which allows further development or revision of the tutorials wherever the programs are implemented, using the ease of coding that CATALYST gives, even though CATALYST may not be available on the host system.

FORTRAN versions of the computer assisted learning modules have been generated using CATRAN, and are currently operating on a DEC PDP11 at the University of Pittsburgh. The FORTRAN implementation on the 11 is not distinguishable from the originally developed CATALYST modules in operation, with these exceptions:

1. Linking between modules is currently not automatic. Users must load each module by system command, rather than by selection from a programmed display; instead of the elaborate linking routine,

```
STI SERVICES TRAINER
====================

Computer Assisted Learning and Practice Modules



Type in the number of the module (1 thru 7), or
the letter of the emulator (A or B), or
L to see the list of modules and emulators, or
E for an explanation:

>7



MODULE 7 -- USING OUTPUT COMMANDS AND FORMATS
=============================================
```

which prompts the user to select a module, the names of the basic seven modules must be known, and the trainee must enter a command:

```
run sti300


MODULE 3 -- LEARNING THE BASIC COMMANDS
=======================================

        This module is concerned with the basics of searching the online
systems.  Practice in doing a simple search is included.

Please select a system from the list below or type DONE.

        DIALOG
       ORBIT
        SCORPIO (not currently available)

>dialog
```

2. Statements which ordinarily would display a "real time" message will display "canned" time and date; instead of

```
?>.FILE 6

04 JUN 1979   11 35 17
$0.57   0.009 hours in file 29
File   06:NTIS       1964-1977     ISS01
                   SET   ITEMS    DESCRIPTION
                   ===   =====    ===========
```

the message will read

```
?.file ntis

############   #########  USER 478 01-MAR-79 13:55
57   0.009 hours in file 29
le   06:NTIS      1964-1977    ISS01

                SET   ITEMS    DESCRIPTION
               ===   =====    ===========


?e aircraft sim
EF    INDEX-TERM                             TYPE  ITEMS  RT
   AIRCRAFT----------------------------         2074
```

3. Statistics of use (see User Histories in appendices) are not collected.

The result of this difference, except perhaps for the loss of the automatic linking, is a small reduction in program continuity, but a major gain in program portability. The concurrent gain in freedom to revise and to add modules which CATRAN provides is well worth the small decrement in TRAINER trueness to the DIALOG or ORBIT original.

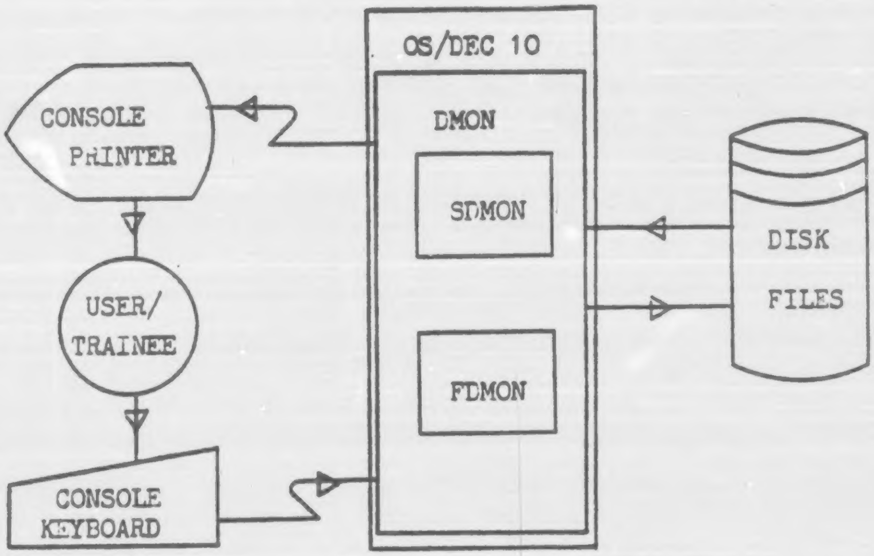
CATRAN should run with essentially no change on all of the DEC PDP11 FORTRAN compilers and operating systems, and on the DEC VAX. It will not run without modifications on the DEC10 system, however.

The CATRAN programs are given with documentation and with examples of use and of FORTRAN code generated, in an appendix to this report.

Emulator Design

A very complete report of the preliminary study of the problems of emulating DIALOG and ORBIT and of design decisions relating to emulator credibility and efficiency and to the requirement that the programs be maximally portable was given in the December 1977 Report of Work Completed, June 1976-November 1977, pp. 15-52. Program descriptions which follow are minimal, to acquaint the reader with the programmed system at a macro level. Documentation referenced in the appended "List of Publications" gives more detailed specifications of the programs.

DIALOG Emulation Overview - the Structure of the DIALOG Emulator



DISK FILES USED BY DMON

DSPECS - File specifications
ERRMS - Error messages
* - Directories (3)
* - Data bases (3)
SETFIL - Sets file (temp.)

DMON is a FORTRAN-X program that monitors the execution of DIALOG emulation. The monitor: logs on users; opens the file specifications file and error messages file; opens the default directory and database files; opens the sets work file; monitors the input, validation and processing of

DIALOG commands; generates error messages to the user; and logs off users at end of session.

SDMON and FDMON consist of FORTRAN-X subroutines and functions, respectively, which perform processing tasks as called by DMON.

DIALOG Emulation is currently entered with the following system command which calls up a DIALOG.SAV file:

```
.RUN DIALOG[134057,120121]
```

or by choosing Module A when in TRAINER.

A parallel set of programs monitor operation of the ORBIT Emulation: ORMON (monitor), SORMON, and FORMON. The ORBIT Emulation may be entered with the system command:

```
.RUN ORBIT [134057,120121]
```

or by choosing Module B when in TRAINER.

Maintaining Files for the ORBIT™ Emulator

ORBIT currently accesses only the NTIS file; the HSPECS.DAT contains specifications for files which ORBIT may access, and is maintained by the OFILES.FOR program.

The FORTRAN programs used by the emulated DIALOG system are:

1.	DMON.FOR	Monitor	fixed length 80 byte records unblocked
2.	SDMON.FOR	Subroutines	
3.	FDMON.FOR	Functions	
4.	DFILES.FOR	File specifications definition	
5.	DSPECS.DAT	File definitions	created by DFILES
6.	ERRMS.DAT	DIALOG error messages	50 byte records unblocked

For each of the two files used as examples in tutorial sequences and printed trainee manuals, the ERIC and NTIS file segments, four separate disk files are maintained:

1.	ERIC.LDC	Documents	1240 byte records unblocked
2.	ERIC.LIX	Basic Index	fixed length 100 byte records unblocked
3.	ERIC.LAX	Author Index	
4.	ERIC.LTX	Title Word Index	
5.	NTIS.LDC	Documents	1240 byte records unblocked
6.	NTIS.LIX	Basic Index	fixed length 100 byte records unblocked
7.	NTIS.LAX	Author Index	
8.	NTIS.LTX	Title Index	

The basic indexes include single words from titles and from index term and description fields and multiword terms from index term and descriptor fields.

Error messages currently generated by the DIALOG^{TM} emulator, the ERRMS.DAT file:

```
INVALID ARGUMENT
EMPTY ARGUMENT STRING
(INTER-SUBROUTINE CONTROL CONDITION)
NO PREVIOUS DISPLAY- ITEM REQUEST NOT SERVICEABLE
ITEM REFERENCE NUMBER OUT OF BOUNDS
50 SETS ALREADY GENERATED
BOOLEAN STRING TOO LONG
INVALID SET VALUE
PARENTHESES MISMATCH
SET NUMBER - SYNTAX ERROR
INVALID SET-RANGE OPERATOR
INVALID FILE NUMBER
INVALID FORMAT CODE
INVALID IMPLICIT COMMAND
ARGUMENT SYNTAX ERROR
UNKNOWN ERROR CONDITION
THESAURUS NOT ON LINE - RELATED TERMS NOT FOUND
COMMAND NOT CURRENTLY SUPPORTED
FILE ERROR
SET FULL
NO SETS CREATED
SET HAS NO MEMBERS
AUTHOR NAME FOUND
AUTHOR NAME NOT FOUND
```

The FORTRAN programs used by the emulated ORBIT^{TM} system:

1.	ORMON.FOR	Monitor
2.	SORMON.FOR	Subroutines
3.	FORMON.FOR	Functions
4.	OFILES.FOR	Defining file specifications
5.	HSPECS.DAT	Specifications of files (created by OFILES.FOR)
6.	ORBERR.DAT	ORBIT error messages

For the NTIS file there are actually only four files, for author, title word, the combined index, and the document record. Provision is made in the OFILES program for indexes to single words only from index terms (IW) to accommodate files, like ERIC, where ORBIT includes multiword terms in the searchable index.

1.	NTIS.SDC	Documents
2.	NTIS.SBX	Combined (Author, title word, subject index (single words))Index
3.	NTIS.SAX	Author Index
4.	NTIS.STX	Title word Index

ORBERR.DAT:ORBIT error messages file, current contents:

```
IS NOT A CORRECT COMMAND NAME
MISSING DOUBLE QUOTE MARK
PLEASE SEE CAI MODULES - TYPE "STOP THEN Y TO EXIT
COMMAND NOT SUPPORTED
INVALID SEARCH STATEMENT REFERENCE NUMBER
SEARCH SERIES FULL. ENTER COMMAND
SEARCH STATEMENT CONTAINS TOO MANY TERMS
ILLOGICAL STATEMENT ENTERED
INVALID SPECIFICATION




PROGRAM EXECUTION ERROR
ORBIT FILE ERROR
UNKNOWN ERROR CONDITION
```

The DIALOG^{TM} emulator source programs occupy approximately 69,120 bytes of online disk on the DEC 10; the ORBIT^{TM} emulator programs occupy about 72,960 bytes. CALP Modules in CATALYST/PIL occupy about 180,000 bytes on the DEC 10; FORTRAN versions of the CALP occupy 60,000 bytes of online storage.

A list of currently available files for TRAINER DIALOG includes:

```
NTIS.LDC  NTIS                       NTIS.LIX  NTIS.LAX  NTIS.LTX
OCEABS.LDCOCEANIC ABSTRACTS          OCEARS.LIXOCEABS.LAXOCEABS.LTX
CMPNDX.LDCENGINEERING INDEX          CMPNDX.LIXCMPNDX.LAXCMPNDX.LTX
CASCON.LDCCAS CONDENSATES            CASCON.LIXCASCON.LAXCASCON.LTX
SOCABS.LDCSOCIOLOGICAL ABS           SOCABS.LIXSOCABS.LAXSOCABS.LTX
ABIINF.LDCARI/INFORM                 ABIINF.LIXABIINF.LAXABIINF.LTX

PSYABS.LDCPSYCH ARSTRACTS            PSYABS.LIXPSYABS.LAXPSYARS.LTX
ERIC.LDC  ERIC                       ERIC.LIX  ERIC.LAX  ERIC.LTX
```

The TRAINER database as distributed includes 500 NTIS and 500 ERIC document records. There are 8 DIALOG structured files: document records; author, title and the basic title word and subject index for ERIC and NTIS. ORBIT structured files, for NTIS only: author, title, and combined author title index. The DIALOG document file is reformatted for ORBIT print formats to save storage costs. These files (which can be extended in size and augmented in number) require about 3.9 M bytes of direct access storage.

Storage for the system as we have distributed it, summarized:

DIALOG emulator (source and compiled)	142,000 bytes
ORBIT emulator (source and compiled)	145,000 bytes
Computer Assisted Learning 7 Modules (FORTRAN) only	200,000 bytes
Data Base (NTIS, ERIC segments)	3,840,000 bytes
Total	4,327,000 bytes

The 4000+ lines of FORTRAN IV code which comprise the programs of the two emulators include 2650 active program statements and 1350 comment lines. We have avoided use of non-standard system features; the exception to this being the LOAD and DEPOSIT BYTE routines and the CPTIME routine. Documentation and coding of these MACRO-10 programs are included in appendices to this report.

Generating TRAINER Searchable Files from Commercially Available Databases

Project resources were not allocated to the extremely demanding task of creating a generalized program to handle all of the formats and varying semantic and syntactic properties which occur in the commercially available databases. A simplified file structure for the inverted indexes was adopted, with incorporated files reformatted to conform:

20 bytes	1 word	1 word		1 word	1 word
Index Term	Level	Disk Address of Document	...	Level	Disk Address of Document
	1st Document			10th Document	

where:

Index Term - is a word or phrase up to 20 characters

Level - indicates where the index term for the document was taken from, e.g., author, title, keyword, abstract

Disk Address of Document - The Relative Record Number, where the document with the associated index term resides

In creating the inverted index each document record is first put into an intermediate format where each field is identified by a standard code, i.e., a "level" code. While each file requires programming to this format, all subsequent processing can be performed by the same program, the PIRCVT program.

The PIRCVT program first creates the document record file (identified in program listings by the .LDC or .LOC extension) to conform to output formats used by DIALOG^{TM} or ORBIT^{TM}. It contains the document data elements as well as a directory of the levels and beginning addresses in the record of each data element. The format is:

Directory to Data Elements				Data Elements	
Level	Beginning Position	Level	Beginning ... Position	Data Element	Data Element ...

The Directory is used to support all of the variations of format used in the TYPE, PRINT, and DISPLAY commands allowed by DIALOG and ORBIT. The level indicates the data element type and the beginning position is a displacement from the beginning of the record indicating the starting position in the record of the data element.

The intermediate TRAINER format is also used to create the inverted indexes. It uses a table whose values can be varied to suit DIALOG™ or ORBIT™ conventions for indexing each file, and TRAINER decisions about which fields should be made searchable. Currently TRAINER indexes only author, title, and any keyword or index term fields which are available on a given tape. A representation of the indexing guide table:

Level	Indexing Mode	Delimiter
0	0	0
1	2	0
2	1	;
3	0	0
4	1	;
5	0	0
6	0	0
7	0	0

Level refers to the data element type, e.g., 1 = title, 2 = author, 4 = keywords.

Indexing mode refers to: 0 = no indexing, 1 = entire data element indexing and 2 = word by word indexing (uniterm).

Delimiter refers to those elements that are to be indexed on a phrase by phrase on data element by data element basis. It informs the program when more than one occurrence of a data element exists, when the end of one has been reached and the beginning of the next one has been encountered. For example:

[2 Jones, Peter M; Smith, John J

The ";" indicates that the end of the first occurrence of the author has been encountered and another occurrence of an author follows. This is a convention produced by the program that generates the intermediate format. Thus, if the indexing mode was "1" (data element), the above record would generate two index entries, one for Jones, Peter M., and one for Smith, John J. This same schema holds for other data elements as well.

If the indexing is word by word, then a second table of "stop" words are utilized to eliminate certain words from appearing in the index. The "stop" word list contains about 40 entries, such as: a, an, and, the, of, about, etc. No attempt has been made to reflect current and changing decisions of DIALOG™ and ORBIT™ in creating this "stop" list; if larger file segments than our implemented 500 records are to be used, this might become a factor to be considered. The output of this part of the program is a file which contains the index terms and their associated document relative disk address. The file format is:

20 bytes	1 word	1 word
Index Term	Level	Disk Address

The index produced by "PIRCVT" must be edited in most cases to produce an index compatible with DIALOG™ and/or ORBIT™. Certain marks of punctuation must be deleted and/or inserted to meet the specifications of thesauri or editing done by Lockheed and ORBIT.

This is done by using either the editor program on the computer system or a specially written program called "TRIM." In either case, the result is a preliminary index with the proper format and punctuation.

Once the preliminary index has been edited it is sorted into alphabetically ascending order; within each alphabetically identical term set, it is sorted on disk address (relocatable address) of the source document record. This sorted file is input to the INDEX program which creates one record for each alphabetically identical entry; it includes coded field names and disk addresses of document records.

The programs which are used in indexing, editing, and creating the index file are written in FORTRAN IV; they are not dependent on the unique characteristics of the University of Pittsburgh's DEC 10 system. An exception, again, is the use of the LOAD and DEPOSIT BYTE routines. These are described, with program listings, in an appendix to this report. A machine with byte addressable capabilities could eliminate the need for such a routine.

Maintaining Files for the DIALOG™ Emulator

DSPECS.DAT is a file that contains specifications defining the desired files that DIALOG Emulation may access. This file is created and maintained with the program DFILES, which is a FORTRAN-X program written specially for this purpose.

In order to specify a database for DIALOG Emulation, the following data must be supplied:

1. The full file name of the database file (as assigned during file generation, preceding section)
2. A 20-character descriptor (as assigned during file generation, preceding section)
3. The full file name of the associated directory file (as assigned during file generation, preceding section)

DFILES is an interactive program which acquires these specifications for each of the three databases accessed during DIALOG Emulation. DFILES is a housekeeping program; it need not be run every time DIALOG Emulation is used, but whenever databases are to be changed. For example, a series of training sessions could be offered to trainees using education databases, and then DFILES could be used to specify a set of technical databases for sessions for other trainees.

The file DSPECS.DAT is read by DMON at the beginning of execution, and the databases specified in DSPECS.DAT become uniquely referenced by DIALOG Emulation File Numbers for the duration of execution. DSPECS.DAT cannot be modified during DIALOG Emulation.

DIALOG Emulation runs under the DEC 10/FORTRAN-X operating system A, and uses approximately 6K core. During emulation the operating system is transparent, DIALOG Emulation handles all errors that may cause abnormal termination

98

of a FORTRAN-X operating system. This configuration limits the amount of "system type" activity that can be performed.

OFILES.FOR and OSPECS.DAT operate for the ORBIT^{TM} emulator in a parallel way to maintain the online database.

```
.DIR DFILES.*

DFILES FOR     6 <111>  11-Apr-78    USRA:   [135113,360171]

.EX DFILES
FORTRAN 5A(621): DFILES.FOR
MAIN.   OCTAL PROG SIZE=1100
LOADING

DFILES 1K CORE
EXECUTION


ON-LINE FILE SPECIFICATIUN MAINTENANCE

FILES CURRENTLY SPECIFIED FOR DIALOG EMULATION DATABASE ARE:

1  NTIS.LDC      NTIS                       DIRECTORIES= NTIS.LIX   ,NTIS.LAX
 ,NTIS.LTX
2  OCEABS.LDC    OCEANIC ABSTRACTS          DIRECTORIES= OCEABS.LIX,OCEABS.LA
X,OCEABS.LTX
3  CMPNDX.LDC    ENGINEERING INDEX          DIRECTORIES= CMPNDX.LIX,CMPNDX.LA
X,CMPNDX.LTX
4  CASCON.LDC    CAS CONDENSATES            DIRECTORIES= CASCON.LIX,CASCON.LA
X,CASCON.LTX
5  SOCABS.LDC    SOCIOLOGICAL ABS           DIRECTORIES= SOCABS.LIX,SOCABS.LA
X,SOCABS.LTX
6  ABIINF.LDC    ABI/INFORM                 DIRECTORIES= ABIINF.LIX,ABIINF.LA
X,ABIINF.LTX
7  BIOSIS.LDC    BIOSIS                     DIRECTORIES= BIOSIS.LIX,BIOSIS.LA
X,BIOSIS.LTX
8  PSYABS.LDC    PSYCH ABSTRACTS            DIRECTORIES= PSYABS.LIX,PSYABS.LA
X,PSYABS.LTX
9  ERIC.LDC      ERIC                       DIRECTORIES= ERIC.LIX   ,ERIC.LAX
 ,ERIC.LTX

DO YOU WISH TO MAKE CHANGES?  Y OR N>N
NO CHANGES


TYPE DSPECS.DAT
TIS.LDC NTIS                         NTIS.LIX  NTIS.LAX  NTIS.LTX  `CEABS.LDCOCEA
NIC ABSTRACTS    OCEABS.LIXOCEABS.LAXOCEABS.LTX`MPNDX.LDCENGINEERING INDE
X   CMPNDX.LIXCMPNDX.LAXCMPNDX.LTX`ASCON.LDCCAS CONDENSATES      CASCON.L
IXCASCON.LAXCASCON.LTX`OCABS.LDCSOCIOLOGICAL ABS     SOCABS.LIXSOCABS.LAX
SOCABS.LTX`BIINF.LDCABI/INFORM       ABIINF.LIXABIINF.LAXABIINF.LTX`IOSIS
.LDCBIOSIS                          BIOSIS.LIXBIOSIS.LAXBIOSIS.LTX`SYABS.LDCPSYC
H ABSTRACTS      PSYABS.LIXPSYABS.LAXPSYABS.LTX`RIC.LDC  ERIC
    ERIC.LIX  ERIC.LAX  ERIC.LTX  `
.
```

Use of DFILES allows
online revision of
DSPECS.DAT -- List
of files DIALOG Emulator
can access for search
or display

documents

basic index

author index

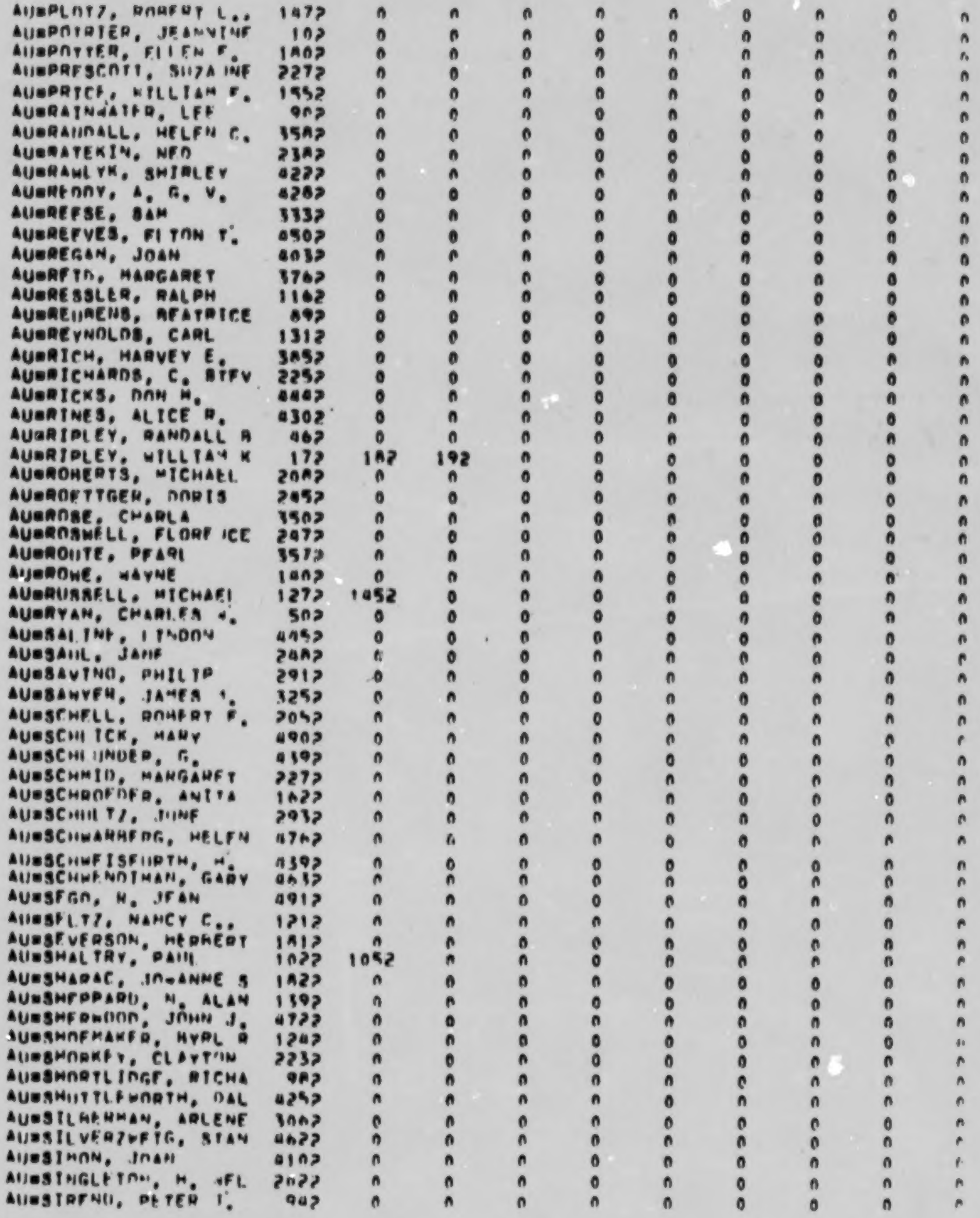
title index

Maintenance of DIALOG^{TM} directory of files.

Before a file can be added, it must be in TRAINER format.

```
ACADEMIC ABILITY      1514     0     0     0     0     0     0     0     0     0
ACADEMIC ACHIEVEMENT    84   254   674   864   904  1284  1434  1644  1694  1754
ACADEMIC APTITUDE     1314     0     0     0     0     0     0     0     0     0
ACADEMIC FAILURE      1344     0     0     0     0     0     0     0     0     0
ACADEMIC STANDARDS    3764  3784  3824     0     0     0     0     0     0     0
ACCEPTANCE            1551  1881     0     0     0     0     0     0     0     0
ACCESS                3661     0     0     0     0     0     0     0     0     0
ACCIDENT              4434     0     0     0     0     0     0     0     0     0
ACCIDENT PREVENTION   4434     0     0     0     0     0     0     0     0     0
ACCOUNTABILITY         281   614  3164  3181  3264  4684  4704     0     0     0
ACCOUNTABLE           4681     0     0     0     0     0     0     0     0     0
ACCREDITATION         2604     0     0     0     0     0     0     0     0     0
ACCREDITATION (INSTI  2604     0     0     0     0     0     0     0     0     0
ACHIEVEMENT             84   254   461   674   864   904  1261  1281  1431  1511
ACQUIRED              3991     0     0     0     0     0     0     0     0     0
ACROSS                1911  4691     0     0     0     0     0     0     0     0
ACT                    464   831   931   974  1711  4544     0     0     0     0
ACTION                 444  1204  2734  2754  2964     0     0     0     0     0
ACTIVISM              3164     0     0     0     0     0     0     0     0     0
ACTIVITIES              44   124   154   164   174   221   304   324   344   354
ACTIVITY               161   171  1114  1124     0     0     0     0     0     0
ACTIVITY UNITS        1114  1124     0     0     0     0     0     0     0     0
ACTS                  4461  4591     0     0     0     0     0     0     0     0
ACTUALIZATION          354  1744  1804  2634  2644  4764     0     0     0     0
AD                    4311  4321  4331  4341     0     0     0     0     0     0
ADAPTATION             204  1404  1651     0     0     0     0     0     0     0
ADAPTATION LEVEL THE   204  1404     0     0     0     0     0     0     0     0
ADDICTION             2164     0     0     0     0     0     0     0     0     0
ADDRESS                101     0     0     0     0     0     0     0     0     0
ADEQUATE              4311     0     0     0     0     0     0     0     0     0
ADJUSTMENT             204   894  1004  1354  1374  1394  1441  1454  1581  1604
ADJUSTMENT (TO ENVIR  1374  1394  1444  1454  1584  1604  1814  2144     0     0
ADJUSTMENT PROBLEMS   1584  1604  1844  3054     0     0     0     0     0     0
ADMINISTRATION          54    84   464   494   634   684   994  1014  1024  1034
ADMINISTRATIVE         124   614   804   994  1174  1734  2214  4524  4534  4624
ADMINISTRATIVE AGENC  1734     0     0     0     0     0     0     0     0     0
ADMINISTRATIVE CHANG  4624     0     0     0     0     0     0     0     0     0
ADMINISTRATIVE PERSO   124   614   804  1174  4534  4744  4784     0     0     0
ADMINISTRATIVE PRINC  2214     0     0     0     0     0     0     0     0     0
ADMINISTRATIVE PROBL   994  4524     0     0     0     0     0     0     0     0
ADMINISTRATOR           54   434   631   804  1024  1054  1074  1841  2564  3051
ADMINISTRATOR ATTITU  3054  3184  3264  3694  4214  4534  4704  4784     0     0
ADMINISTRATOR CHARAC  3714     0     0     0     0     0     0     0     0     0
ADMINISTRATOR EDUCAT   434   804     0     0     0     0     0     0     0     0
ADMINISTRATOR EVALUA  4634     0     0     0     0     0     0     0     0     0
ADMINISTRATOR GUIDES    54   634  1024  1844  2564  3384     0     0     0     0
ADMINISTRATOR RESPON   634     0     0     0     0     0     0     0     0     0
ADMINISTRATOR ROLE     804  1024  1054  1074     0     0     0     0     0     0
ADMINISTRATOR SELECT  3714     0     0     0     0     0     0     0     0     0
ADMINISTRATORS         901     0     0     0     0     0     0     0     0     0
ADMISSION             2004  3664     0     0     0     0     0     0     0     0
ADMISSION CRITERIA    2004     0     0     0     0     0     0     0     0     0
ADOLESCENCE           1611  2864     0     0     0     0     0     0     0     0
ADOLESCENT            1374  3871  3901     0     0     0     0     0     0     0
ADOLESCENT LITERATUR  1374     0     0     0     0     0     0     0     0     0
ADOLESCENTS            261   271  1314  1494  1614  1784  2094  3844  3874  3891
ADULT                   24    51    91   204   234   474   514   541   551   561
ADULT BASIC EDUCATIO    54    94   924  2364  4354  4944  4954  4964  4984  5004
ADULT CHILD RELATION  1864     0     0     0     0     0     0     0     0     0
ADULT COUNSELING       644  1214  2284  2294     0     0     0     0     0     0
```

ERIC.LIX, The basic subject (i.e., suffix) index
for use with DIALOG emulator



```
AU=PLOTZ, ROBERT L.,  1472    0    0    0    0    0    0    0    0    0
AU=POIRIER, JEANNINE   102    0    0    0    0    0    0    0    0    0
AU=POTTER, ELLEN F.   1802    0    0    0    0    0    0    0    0    0
AU=PRESCOTT, SUZANNE  2272    0    0    0    0    0    0    0    0    0
AU=PRICE, WILLIAM F.  1552    0    0    0    0    0    0    0    0    0
AU=RAINWATER, LEE      902    0    0    0    0    0    0    0    0    0
AU=RANDALL, HELEN C.  3582    0    0    0    0    0    0    0    0    0
AU=RATEKIN, NED       2382    0    0    0    0    0    0    0    0    0
AU=RAWLYK, SHIRLEY    4222    0    0    0    0    0    0    0    0    0
AU=REDDY, A. G. V.    4282    0    0    0    0    0    0    0    0    0
AU=REESE, SAM         3332    0    0    0    0    0    0    0    0    0
AU=REEVES, ELTON T.   4502    0    0    0    0    0    0    0    0    0
AU=REGAN, JOAN        4032    0    0    0    0    0    0    0    0    0
AU=REID, MARGARET     3762    0    0    0    0    0    0    0    0    0
AU=RESSLER, RALPH     1162    0    0    0    0    0    0    0    0    0
AU=REUBENS, BEATRICE   892    0    0    0    0    0    0    0    0    0
AU=REYNOLDS, CARL     1312    0    0    0    0    0    0    0    0    0
AU=RICH, HARVEY E.    3852    0    0    0    0    0    0    0    0    0
AU=RICHARDS, C. STEV  2252    0    0    0    0    0    0    0    0    0
AU=RICKS, DON H.      4442    0    0    0    0    0    0    0    0    0
AU=RINES, ALICE R.    4302    0    0    0    0    0    0    0    0    0
AU=RIPLEY, RANDALL B   462    0    0    0    0    0    0    0    0    0
AU=RIPLEY, WILLIAM K   172  182  192    0    0    0    0    0    0    0
AU=ROBERTS, MICHAEL   2082    0    0    0    0    0    0    0    0    0
AU=ROETTGER, DORIS    2452    0    0    0    0    0    0    0    0    0
AU=ROSE, CHARLA       3502    0    0    0    0    0    0    0    0    0
AU=ROSWELL, FLORENCE  2472    0    0    0    0    0    0    0    0    0
AU=ROUTE, PEARL       3572    0    0    0    0    0    0    0    0    0
AU=ROWE, WAYNE        1802    0    0    0    0    0    0    0    0    0
AU=RUSSELL, MICHAEL   1272 1452    0    0    0    0    0    0    0    0
AU=RYAN, CHARLES H.    502    0    0    0    0    0    0    0    0    0
AU=SALINE, LYNDON     4452    0    0    0    0    0    0    0    0    0
AU=SAUL, JANE         2482    0    0    0    0    0    0    0    0    0
AU=SAVINO, PHILIP     2912    0    0    0    0    0    0    0    0    0
AU=SAWYER, JAMES A.   3252    0    0    0    0    0    0    0    0    0
AU=SCHELL, ROBERT F.  2052    0    0    0    0    0    0    0    0    0
AU=SCHLICK, MARY      4902    0    0    0    0    0    0    0    0    0
AU=SCHLUNDER, G.      4392    0    0    0    0    0    0    0    0    0
AU=SCHMID, MARGARET   2272    0    0    0    0    0    0    0    0    0
AU=SCHROEDER, ANITA   1622    0    0    0    0    0    0    0    0    0
AU=SCHULTZ, JUNE      2932    0    0    0    0    0    0    0    0    0
AU=SCHWARZBERG, HELEN 4762    0    0    0    0    0    0    0    0    0

AU=SCHWEISFURTH, H.   4392    0    0    0    0    0    0    0    0    0
AU=SCHWENDIMAN, GARY  4632    0    0    0    0    0    0    0    0    0
AU=SEGO, H. JEAN      4912    0    0    0    0    0    0    0    0    0
AU=SELTZ, NANCY C.,   1212    0    0    0    0    0    0    0    0    0
AU=SEVERSON, HERBERT  1812    0    0    0    0    0    0    0    0    0
AU=SHALTRY, PAUL      1022 1052    0    0    0    0    0    0    0    0
AU=SHARAC, JO-ANNE S  1822    0    0    0    0    0    0    0    0    0
AU=SHEPPARD, H. ALAN  1392    0    0    0    0    0    0    0    0    0
AU=SHERWOOD, JOHN J.  4722    0    0    0    0    0    0    0    0    0
AU=SHOEMAKER, MYRL R  1242    0    0    0    0    0    0    0    0    0
AU=SHORKEY, CLAYTON   2232    0    0    0    0    0    0    0    0    0
AU=SHORTLIDGE, RICHA   982    0    0    0    0    0    0    0    0    0
AU=SHUTTLEWORTH, DAL  4252    0    0    0    0    0    0    0    0    0
AU=SILBERMAN, ARLENE  3062    0    0    0    0    0    0    0    0    0
AU=SILVERZWEIG, STAN  4622    0    0    0    0    0    0    0    0    0
AU=SIMON, JOAN        4102    0    0    0    0    0    0    0    0    0
AU=SINGLETON, H. NEL  2022    0    0    0    0    0    0    0    0    0
AU=SIRENO, PETER J.    942    0    0    0    0    0    0    0    0    0
```

ERIC.LAX, Author index in DIALOG format

Further development of TRAINER, in addition to extending it to provide instruction in all remaining system capabilities should include the improvement of file structure to include all searchable fields in its indexes and of course to allow more postings per indexed term.

103

Dissemination Activities

Efforts have been made in two areas. First to inform the library and information science professionals of TRAINER's existence, function, goals, availability; to create public awareness. Secondly we have attempted to encourage other institutions to implement the TRAINER programs, to permit more individuals to use the online training and practice modules.

Creating Public Awareness of TRAINER

Information about TRAINER has been made publicly available by participation and delivery of papers at international, national, and regional meetings. Articles have been published, and delivered papers are available in published proceedings of those meetings. These are documented in an appendix to this report.

Additionally, over 125 inquiries have been responded to; a mailing list was created from those inquiries. As TRAINER neared completion, Monthly Newsletters, March '78-March '79, were sent to individuals on the list. A final newsletter mailing was sent to the 60+ AALS Library Schools. Analysis of the correspondence was performed to separate general interest queries and declarations of interest to obtain or use TRAINER. Of the letters and calls received, 49 indicated definite interest in implementing the TRAINER system, or, as is not presently possible, in accessing the University of Pittsburgh version by telecommunication network (TYMNET and TELENET ports do not exist on the University of Pittsburgh system).*

Considering that TRAINER articles have appeared only in highly specialized journals,[1] this rate of inquiry seems quite high, indicative of the training need which presently exists for online user training.

---

*TELENET access to Gallaudet College's implementation will be used for demonstration purposes during May 17-18 Workshop, Bibliographic Center for Research, Denver, CO.

[1] Online, On-Line Review and Library Science with a Slant Toward Documentation

The aforementioned articles and papers were presented to those sectors of the possible user population which have already become aware of the importance of online searching; and of the need for extended and flexible training.

The extent of interest, even among information professionals, was beyond our early expectations; conferences, workshops, seminars are always oversubscribed. The 1977 Pittsburgh Conference, On-Line Revolution in Libraries, at which TRAINER was first publicly introduced, drew 600+ attendees; whereas other conferences in the series draw 200-300 participants!

Since TRAINER was designed primarily for use by professionals in other fields than library or information science, we believe it is now time to examine ways to extend public awareness about TRAINER and its use.

We have attempted to look at the need for TRAINER from two perspectives: geographical locales where a TRAINER implementation might be useful; classes or categories of individual users by mission and/or discipline of their primary occupations; and institutional structures already existing which might serve as nucleating centers for TRAINER user populations.

In this effort we also consider the actual inquiries we have received and try to identify the mechanism which initiated the actual inquiry; if no inquiries have been made from the sector we postulate means which could be used effectively to make TRAINER more visible to that community.

Geographic areas are considered first, because they make fundamental differences in the version of TRAINER which should be implemented. The conditions which are critical are these:

1. Telecommunications costs to reach the West Coast U.S. installations of DIALOG^{TM}, ORBIT^{TM}
2. Present use or availability of DIALOG^{TM} and ORBIT^{TM} services.

105

If these costs are high, as in the case of Australia, Europe, then the complete program would be necessary; extension of emulator capabilities, database size, and of CALP content would be desirable to the end that as much training as possible be completed in the local computing environment.

If, additionally, the online services are not yet available in the area, as in the Middle East, Africa, peninsular Asian countries, then the extension of the databases would be of primary importance because the TRAINER emulators would be a first experience with online systems. Extension of emulator capabilities and CALP would be of lesser priority in these instances.

Modular programs make the following logical divisions of TRAINER easily separable or extensible.

CALP Computer Assisted Learning Modules can be used individually or deleted, or replaced if desired. Each of these seven modules could be extended, if desired, to include more advanced capabilities, complexities, or additional practice and/or explanatory materials. In addition to DIALOG or ORBIT, other systems could be given similar inclusion and developments, depending on local needs and preferences.

Emulators Either of the two emulated systems could, if circumstances warrant, be extended to mimic more, or all, of the target system capabilities. Other systems could be emulated by incorporating interfacing programs to translate new commands, protocols into the basic TRAINER program's expected formats.

The TRAINER database could be extended to include more files, and/or longer file segments, again depending on local needs.

In the U.S./Canada sector, the present TRAINER version could be used with no augmentationor extension of present programs: the tutorial modules to reduce the burden of elementary teaching needed; the emulated DIALOG^{TM} and ORBIT^{TM} to reduce communication costs to the California-based systems, and to reduce the load on those operational services during practice use at early training stages. Advanced training--use of full text searching and automatically recurrent individualized searches, for example--should not occur until the user has done some work in the full scale files of the operational services; it is better accomplished on the operational service, especially if special training rates are available ($15/hour + network or WATS line charges).

Analysis of our mailing list shows some awareness of TRAINER, and of need for online search skill training in 13 countries:

Australia	8 inquiries	
Canada	7 inquiries	
England	5 inquiries	
India	2 inquiries	(proposal being developed for submission to N.S.F.)
Saudi Arabia		(cooperative access in planning stages)
Austria	2 inquiries	
Italy	2 inquiries	
Japan	1 inquiry	
South Africa	1 inquiry	
Sweden	1 inquiry	
Switzerland	1 inquiry	
Yugoslavia	1 inquiry	
Wales	1 inquiry	

To categorize possible groups of users or institutional environments for TRAINER installations, before the fact, proved difficult; instead we tried to make "sense" of the potential users who were represented in our mailing lists, and of actual populations who applied to us to use TRAINER.

Librarians within the University of Pittsburgh were TRAINER's earliest users. A second group of librarians applied through the agency of a resource network to which they belonged (Metropolitan Information Network, Philip Tompkins, Director, Kansas City, Missouri).

Chemists and other faculty of Muskingum College, Ohio, were the first end-user population of users to, literally, present themselves. Here the initiating force was supplied by one individual, Dr. Robert Landolt, chemist, who became aware of the particular value of the online search to chemists and "sold" the idea of arranging TRAINER use at Muskingum (see elsewhere this report for more on this group).

At the University of Pittsburgh the most coherent group of end users were, again, chemists who approached TRAINER use, via the Librarian of the Chemistry Library, Paul Kobulnicky. Similarly, at the Graduate School of Public and International Affairs, a noticeably coherent population can be attributed to the activity of the Librarian, Nicholas Caruso.

These instances bear out the conclusions of Firschein, et al, that a critical aspect of user entry to the use of online searches is the attitude of the personnel who constitute access points or "gateways."

Analysis of the mail and phone inquiries reflect greatest awareness of interest in TRAINER, to date, from individuals in

University Libraries (29)
Educational institutions/librarianship (23)
Library networks (17)
Corporate libraries (11)
Government agencies (10)
International or foreign governmental (7)
Research laboratories (5)
Public libraries (3)
Individuals: Computer Instruction (2)
    "   Chemists (2)
    "   Operations Research (1)
    "   Newspaper Publisher (1)
    "   Physicists (1)
(Pitt Chemists not included)

A recent mailing of an announcement of availability of TRAINER documentation and tapes, on payment of costs for reproduction in each instance, has generated satisfying response: 110 copies of TRAINER documents have been distributed and four tapes of the complete set of programs have gone out.

"TRAINER Workshop" Format

At the recent (May 17-18) workshop on TRAINER at the Bibliographic Center for Research, Denver, Colorado, a three-session format for the introduction of TRAINER to online search trainers was developed.

Session 1

1. Rationale for TRAINER development
2. Overview of TRAINER design and use
3. Online demonstration, by Workshop personnel, of use of TRAINER
4. Detailed review of TRAINER content
5. Summary of use statistics and trainee learning

Session 2

1. Hands on use of tutorials on DEC-10 and PDP-11 at Pittsburgh
2. Use of emulators on DEC-10 and PDP-11 at Pittsburgh and at Gallaudet College and Syracuse University

Session 3

1. Review of Sessions 1, 2, discussion
2. Overview of computer programs
3. Program implementation on large scale and minicomputers

Training Modules for Users of Scientific and Technical Information Services

N.S.F. Grant No. DSI 77-26525

Publications List

1. TRAINER Presentation Package, March 1979, v.p. (60 p.)

2. TRAINER Manual. Computer Assisted Learning and Practice Modules for Users of DIALOG^R and ORBIT^R. March, 1979, 72 p.

3. Mini-Manual for Users of TRAINER. 8 p., March 1979.

4. Pocket Reference Card for Users of TRAINER. One page, 3 fold, March 1979.

5. "Online Training for Searching Online," in (Proceedings) Second International Online Information Meeting, London, December 5-7, 1978, pp. 37-48.

6. "Hands On On-Line in a Multi-System, Multi-Data Base TRAINER," Library Science with a Slant to Documentation, December 15:82(1978)

7. "Hands-On Online: Bringing it Home," On-Line Review, London, v. 2, no. 3(September 1978).

8. (with John Griffith) "A TRAINER for Online Systems," Online, v. 1, no. 3(October 1977), pp. 28-34.

9. "Training and Retraining of Librarians and Users," in The On-Line Revolution in Libraries, Marcel Dekker, 1978, pp. 207-228.

10. "Training Modules for Online Retrieval Services," Paper M in Proceedings of the Indo-U.S. Seminar on Scientific and Technical Information, Bangalore, India, July 18-22, 1977.

11. "Training Modules for Users of Scientific and Technical Information Services," Progress Report, N.S.F. Grant No. DSI 76-09538, October 1976.
    ____________Jan. 1977
    ____________May 1977
    ____________Dec. 1977

    ____________N.S.F. Grant No. DSI 77-26525, June 1978
    ____________Sept. 1978
    ____________Jan. 1979
    ____________Final Technical Report, June 1979

Training Modules for Users of Scientific and Technical Information Services
N.S.F. Grant No. DSI 77-26525

Papers Presented

"Online Training for Searching Online," Paper B5, 2nd International Online Information Meeting, London, Dec. 5-8, 1978.

"The Responsibility of the Information Scientist to Users of the New Online Information Services," NATO Advanced Study Institute in Information Science, Chania, Crete, Greece, August 7, 1978.

"Learning to Use Online Systems; the TRAINER," Presented to Division of Science Information, National Science Foundation, Washington, DC, January 10, 1978 (50 participants, in two one hour sessions).

"The Introduction of New Technology into the Information System of India," Pittsburgh Chapter, ASIS, December 6, 1977.

"Training and Retraining Librarians and Users," On-Line Revolution in Libraries, 2nd Pittsburgh Conference, Pittsburgh, PA, Nov. 14-16, 1977.

"Training Modules for Users of Online Bibliographic Retrieval Services," Indo-U.S. Seminar on Scientific and Technical Information, INSDOC, Bangalore, India, July 16-29, 1977.

"Training for Online Searching," (see Bulletin of ASIS, v. 3, no. 6, p. 35(Aug. 1977), 6th ASIS Mid-Year Meeting (80 participants) Syracuse University, Syracuse, NY, May 18, 1977.

Leader, Advanced Online Training Workshop, May 17-18, 1979. Bibliographic Center for Research, Rocky Mountain Region, Denver, Colorado.

Panelist, Microcomputers in Library Operation, May 19, 1979. Microcomputer Weekend College, Graduate School of Librarianship, University of Denver.

Publications Referenced

1. British Library Research and Development Report. "The Use of On-Line Search in Teaching. An assessment..." (Report No. 5390, May 1977).

2. _______________. On-Line Information Retrieval, v. 1, 1. (Report No. 5360, 1977).

3. Data Base; The Magazine of Data Base Reference and Review, v. 1, no. 1, September 1978.

4. Final Technical Report, S.T.I. Training Modules Project, Dec. 1977.

5. Firschein, Oscar; R.K. Summit; and C.K. Mick. "Use of On-Line Bibliographic Search in Public Libraries: a Retrospective Emulation," Online Review, v. 2, no. 1, Mar. 1978, pp. 41-55.

6. "Highlights & Hints: ORBIT™ 1. Principles of Design: ORBIT Search Strategies," System Development Corp., Santa Monica, CA, n.d.

7. "Libraries in 2001: a Prediction," LJ Hotline, v. 8, no. 19, May 14, 1979.

8. McCarn, Davis. "Online Systems--Techniques and Services," in v. 13, Annual Review of Information Science and Technology, Wiley, 1978.

9. Progress Report, March-May 1978; S.T.I. Training Modules Project, University of Pittsburgh, Pittsburgh, PA.

10. Progress Report, Sept.-Dec. 1978; S.T.I. Training Modules Project, University of Pittsburgh, Pittsburgh, PA., December 1978.

11. Slavens, Thomas P., and M. E. Ruby. "Teaching Library Science Students to do Bibliographic Searches of Automated Data Bases." RQ, v. 18, no. 1, Fall 1978, pp. 39-41.

12. TRAINER Manual, S.T.I. Training Modules Project, 72 p. Rev. Feb. 1979.

13. Wood, A.J. "On-Line Bibliographic Searching," Manchester Polytechnic, Department of Library and Information Studies, 1976.

14. Caruso, Elaine and John Griffith. "A TRAINER for Online Systems," Online, v. 1, no. 4, October 1977.

15. Caruso, Elaine. "Online Training for Searching Online" presented at the 2nd International Online Information Meeting, London, Dec. 5-7, 1978.

16. Caruso, Elaine. "Hands On Online: Bringing it Home," Online Review, v. 1, no. 3, 1978.

17. Caruso, Elaine. "Hands On Online in a Multi-System Multi-Data Base TRAINER," Library Science with a Slant Toward Documentation, v. 5, no. 2, June 1978, pp. 83-88.

18. Caruso, Elaine. "Training and Retraining of Librarians and Users," in the On-Line Revolution in Libraries, Proceedings of the 1977 Conference, Marcel Dekker, 1978, pp. 207-228.

Project personnel have included:

Pearl Berger	Project Secretary
Elaine Caruso	Principal Investigator August 1976 - August 1979
James Williams	Consultant August 1976 - August 1979
John Griffiths	Programmer August 1976 - December 1977
Hamid Ghaheri	Programmer January 1978 - February 1979
Roger Rathburn	G.S.A. September 1976 - December 1977
Sonya Thelin	G.S.A. January 1978 - August 1978
James Thomas	G.S.A. September 1978 - February 1979
Ronal K. Nicholas	Consultant August 1976 - February 1979
Helen Nicholas	Consultant August 1976 - February 1979
Arthur Wetzel	Consultant December 1978 - February 1979
Joan Scollon	Practicum September - December 1977

Members of the community of the Graduate School of Library and Information Sciences and the larger University of Pittsburgh community have participated as users and critics with much benefit to the Project and some, we hope, to themselves. In particular we are grateful to Jean Guasco who performed tirelessly in "bullet proofing" the uncounted versions of the nine modules, and in keeping us at an acceptable level of literacy in the tutorial parts of the programs and user documents.

And of course--my gratitude to my husband--enthusiastic supporter of TRAINER and TRAINER goals, for his help and encouragement; and to my son, sometime subject and user of TRAINER--who has listened to me speaking of TRAINER and admitted that I was "as good as the others."

Appendix 1

User Histories

```
      .
                               0:00
      .

                               0:00
      .

                               0:00
      .

                               0:00
110153,247151

            08 MAY 1979        15:45          CALP ENTRY"
                               15:52    1     ENTRY"
                               15:54    1     ABORTED"                2 MIN.
                               15:56    2     TYMNET ENTRY"
                               15:59    2     TYMNET EXIT"            3 MIN.
                               16:01    3     DIALOG ENTRY"
                               16:07    3     DIALOG ABORTED"         6 MIN.
                               16:07    3     DIALOG ENTRY"
                               16:20    3     DIALOG EXIT"           13 MIN.
                               16:21          CALP EXIT"
                               18:11          CALP ENTRY"
                               18:18          CALP ENTRY"
                               18:19    3     DIALOG ENTRY"
                               18:28    3     DIALOG EXIT"            9 MIN.
                               18:28    3     DIALOG ENTRY"
                               18:37    3     DIALOG EXIT"            9 MIN.
                               18:37    3     DIALOG ENTRY"
                               18:43    3     DIALOG EXIT"            6 MIN.
                               18:44    3     DIALOG ENTRY"
                               18:49    3     DIALOG EXIT"            5 MIN.
                               18:50          CALP EXIT"
            14 MAY 1979        19:16          CALP ENTRY"
                               19:17    3     DIALOG ENTRY"
                               19:26    3     DIALOG EXIT"            9 MIN.
                               19:26    3     DIALOG ENTRY"
                               19:32    3     DIALOG EXIT"            6 MIN.
                               19:35          LINK TO DIALOG
                               19:35    A     DIALOG     ENTRY
                               19:41    A     DIALOG     ENTRY
                               20:05          CALP ENTRY"
                               20:06    4     INTRODUCTION"
                               20:07    4     ABORT EXIT"             1 MIN.
                               20:08    3     DIALOG ENTRY"
                               20:12    3     DIALOG EXIT"            4 MIN.
                               20:14    3     DIALOG ENTRY"
                               20:15    3     DIALOG ABORTED"         1 MIN.
                               20:16          LINK TO DIALOG
                               20:16    A     DIALOG     ENTRY
                               20:28    A     DIALOG     EXIT        12 MIN.
                               20:30          CALP EXIT"
```

```
          16 MAY 1979     18:03          CALP ENTRY"
                          18:03          LINK TO DIALOG
                          18:03     A    DIALOG    ENTRY
                          18:08     A    DIALOG    EXIT         5 MIN.
                          18:10          LINK TO DIALOG
                          18:10     A    DIALOG    ENTRY
                          18:15     A    DIALOG    EXIT         5 MIN.
                          18:17     3    DIALOG ENTRY"
                          18:23     3    DIALOG EXIT"           6 MIN.
                          18:23     3    DIALOG ENTRY"
                          18:24     3    DIALOG ABORTED"        1 MIN.
                          18:25          LINK TO DIALOG
                          18:25     A    DIALOG    ENTRY
                          18:37     A    DIALOG    EXIT        12 MIN.
                          18:44          CALP ENTRY"
                          18:45     3    ORBIT ENTRY"
                          19:02     3    ORBIT EXIT"           17 MIN.
                          19:03     3    ORBIT ENTRY"
                          19:11     3    ORBIT EXIT"            8 MIN.
                          19:11          LINK TO ORBIT E
                          19:18          LINK TO ORBIT E
                          19:36          CALP ENTRY"
                          19:36          LINK TO ORBIT E
                                                    LOGGED IN:   186 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
110500,121311

          16 MAR 1979      9:49          CALP ENTRY"
                           9:50          CALP EXIT"
                          10:28          CALP ENTRY"
                          10:33     2    TELENET ENTRY"
                          10:38     2    TELENET EXIT"          5 MIN.
                          10:40     3    DIALOG ENTRY"
                          10:43     3    DIALOG ABORTED"        3 MIN.
                          10:43     3    DIALOG ENTRY"
                          10:58     3    DIALOG EXIT"          15 MIN.
                          10:58     3    ORBIT ENTRY"
                          11:09     3    ORBIT EXIT"           11 MIN.
                          11:18          CALP EXIT"
                                                    LOGGED IN:    43 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
110500,126121

          08 FEB 1979     12:20          CALP ENTRY"
                          12:21          LINK TO ORBIT E
                          12:21     B    ORBIT     ENTRY
                          12:23     B    ORBIT     EXIT         2 MIN.
          09 FEB 1979     14:51          CALP ENTRY"
                          14:51          LINK TO DIALOG
                          14:51     A    DIALOG    ENTRY
                          15:03     A    DIALOG    EXIT        12 MIN.
          16 FEB 1979     13:06          CALP ENTRY"
                          13:06     1    ENTRY"
                          13:22     1    EXIT"                 16 MIN.
                          13:26     2    TYMNET ENTRY"
                          13:28     2    TYMNET EXIT"           2 MIN.
```

```
                 13:28   2   TELENET ENTRY"
                 13:31   2   TELENET EXIT"          3 MIN.
                 13:33   3   DIALOG ENTRY"
                 13:48   3   DIALOG EXIT"          15 MIN.
                 13:50       LINK TO DIALOG
                 13:50   A   DIALOG    ENTRY
                 14:01   A   DIALOG    EXIT        11 MIN.
20 FEB 1979      15:34       CALP ENTRY"
                 15:36   1   ENTRY"
                 15:44   1   ABORTED"               8 MIN.
                 15:46   2   TYMNET ENTRY"
                 15:48   2   TYMNET EXIT"           2 MIN.
                 15:48   2   TELENET ENTRY"
                 15:57   2   TELENET EXIT"          9 MIN.
                 15:58       LINK TO DIALOG
                 15:58   A   DIALOG    ENTRY
                 16:07   A   DIALOG    EXIT         9 MIN.
                 16:13   3   DIALOG ENTRY"
                 16:15   3   DIALOG ABORTED"        2 MIN.
                 16:16       CALP EXIT"
22 FEB 1979      15:38       CALP ENTRY"
                 15:38   3   DIALOG ENTRY"
                 15:51   3   DIALOG ABORTED"       13 MIN.
                 15:52       CALP EXIT"
07 MAR 1979      12:55       CALP ENTRY"
                 12:55       CALP EXIT"
16 MAR 1979       9:35       CALP ENTRY"
                  9:36       CALP EXIT"
                 10:12       CALP ENTRY"
                 10:12       LINK TO DIALOG
                 10:12   A   DIALOG    ENTRY
                 10:16   A   DIALOG    EXIT         4 MIN.
                 10:28       CALP ENTRY"
                 10:33   2   TELENET ENTRY"
                 10:36   2   TELENET EXIT"          3 MIN.
                 10:40   3   DIALOG ENTRY"
                 10:58   3   DIALOG EXIT"          18 MIN.
                 10:58   3   ORBIT ENTRY"
                 11:09   3   ORBIT EXIT"           11 MIN.
                 11:10       CALP EXIT"
                 12:24       CALP ENTRY"
                 12:25       LINK TO ORBIT E
                 14:59   2   TELENET ENTRY"
                 15:03   2   TELENET EXIT"          4 MIN.
                 15:04   2   TYMNET ENTRY"
                 15:06   2   TYMNET EXIT"           2 MIN.
                 15:07       LINK TO ORBIT E
                 15:12       CALP ENTRY"
                 15:14   2   TELENET ENTRY"
                 15:15   2   TELENET EXIT"          1 MIN.
                 15:18   3   DIALOG ENTRY"
                 15:27   3   DIALOG ABORTED"        9 MIN.
                 15:28       CALP EXIT"
                 16:38       CALP ENTRY"
                 16:40   2   TELENET ENTRY"
                 16:43   2   TELENET EXIT"          3 MIN.
                 16:45   3   DIALOG ENTRY"
                 16:57   3   DIALOG EXIT"          12 MIN.
                 16:57   3   ORBIT ENTRY"
                 17:06   3   ORBIT EXIT"            9 MIN.
```

```
                          17:07    3   DIALOG ENTRY"
                          17:07    3   DIALOG ABORTED"       0 MIN.
                          17:08        CALP EXIT"
           29 MAY 1979     9:32        CALP ENTRY"
                           9:35    2   TELENET ENTRY"
                           9:37    2   TELENET EXIT"         2 MIN.
                           9:38    2   TELENET ENTRY"
                           9:39    2   TELENET EXIT"         1 MIN.
                           9:39    2   TYMNET ENTRY"
                           9:40    2   TYMNET EXIT"          1 MIN.
                           9:42    2   TYMNET ENTRY"
                           9:43    2   TYMNET EXIT"          1 MIN.
                           9:46    3   DIALOG ENTRY"
                           9:56    3   DIALOG EXIT"         10 MIN.
                           9:56    3   ORBIT ENTRY"
                          10:01    3   ORBIT EXIT"           5 MIN.
                          10:12    3   DIALOG ENTRY"
                          10:19    3   DIALOG EXIT"          7 MIN.
                          10:22    4   INTRODUCTION"
                          10:27    4   END OF INTRO."        5 MIN.
                          10:28    4   DIALOG ENTRY"
                          10:35    4   DIALOG EXIT"          7 MIN.
                          10:35    4   INTRODUCTION"
                          10:40    4   END OF INTRO."        5 MIN.
                          10:40    4   ORBIT ENTRY"
                          10:46    4   ORBIT EXIT"           6 MIN.
                          10:46    4   INTRODUCTION"
                          10:51    4   END OF INTRO."        5 MIN.
                          10:52    4   ORBIT ENTRY"
                          10:55    4   ORBIT EXIT"           3 MIN.
                          10:57    5   DIALOG ENTRY"
                          11:11    5   DIALOG EXIT"         14 MIN.
                          11:11    5   ORBIT ENTRY"
                          11:25    5   ORBIT EXIT"          14 MIN.
                          11:25    5   SCORPIO ENTRY"
                          11:31    5   SCORPIO EXIT"         6 MIN.
                          11:31    5   SCORPIO ENTRY"
                          11:35    5   ABORT EXIT"           4 MIN.
                          11:35    6   INTRODUCTION"
                          11:36    6   END OF INTRO."        1 MIN.
                          11:37    6   DIALOG ENTRY"
                                                  LOGGED IN:    507 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
110500,262461


           16 MAY 1979    14:20        CALP ENTRY"
                          14:20    1   ENTRY"
                          14:22    1   ABORTED"              2 MIN.
                          14:23    2   TYMNET ENTRY"
                          14:25    2   TYMNET EXIT"          2 MIN.
                          14:25    2   TYMNET ENTRY"
                          14:26    2   TYMNET EXIT"          1 MIN.
                          14:27    2   TELENET ENTRY"
                          14:29    2   TELENET EXIT"         2 MIN.
                          14:29    2   TELENET ENTRY"
                          14:30    2   TELENET EXIT"         1 MIN.
                          14:30    2   TYMNET ENTRY"
                          14:31    2   TYMNET EXIT"          1 MIN.
```

```
                    14:31   2   TELENET ENTRY"
                    14:32   2   TELENET EXIT"          1 MIN.
                    14:32   2   TYMNET ENTRY"
                    14:32   2   TYMNET EXIT"           0 MIN.
                    14:33   3   DIALOG ENTRY"
                    14:39   3   DIALOG EXIT"           6 MIN.
                    14:39   3   ORBIT ENTRY"
                    14:45   3   ORBIT EXIT"            6 MIN.
                    14:45   3   DIALOG ENTRY"
                    14:49   3   DIALOG EXIT"           4 MIN.
                    14:50   3   ORBIT ENTRY"
                    14:54   3   ORBIT EXIT"            4 MIN.
                    14:55   4   INTRODUCTION"
                    15:05   4   END OF INTRO."        10 MIN.
23 MAY 1979         13:02       CALP ENTRY"
                    13:03   2   TYMNET ENTRY"
                    13:04   2   TYMNET EXIT"           1 MIN.
                    13:04   2   TELENET ENTRY"
                    13:05   2   TELENET EXIT"          1 MIN.
                    13:05   2   TYMNET ENTRY"
                    13:05   2   TYMNET EXIT"           0 MIN.
                    13:06   2   TELENET ENTRY"
                    13:06   2   TELENET EXIT"          0 MIN.
                    13:06   4   INTRODUCTION"
                    13:10   4   END OF INTRO."         4 MIN.
                    13:11   4   DIALOG ENTRY"
                    13:38       CALP ENTRY"
                    13:41   4   INTRODUCTION"
                    13:43   4   END OF INTRO."         2 MIN.
                    13:44   4   DIALOG ENTRY"
                    13:49   4   DIALOG EXIT"           5 MIN.
                    13:49   4   ORBIT ENTRY"
                    13:54   4   ORBIT EXIT"            5 MIN.
                    13:54       CALP EXIT"
24 MAY 1979         13:18       CALP ENTRY"
                    13:19   4   INTRODUCTION"
                    13:22   4   END OF INTRO."         3 MIN.
                    13:22   4   ORBIT ENTRY"
                    13:27   4   ORBIT EXIT"            5 MIN.
                    13:28   4   DIALOG ENTRY"
                    13:34   4   DIALOG EXIT"           6 MIN.
                    13:35   4   ABORT EXIT"
                    13:36   5   DIALOG ENTRY"
                    13:43   5   DIALOG EXIT"           7 MIN.
                    13:43   5   ORBIT ENTRY"
                    13:53   5   ORBIT EXIT"           10 MIN.
                    13:53   5   DIALOG ENTRY"
                    13:59   5   DIALOG EXIT"           6 MIN.
                    13:59   5   ORBIT ENTRY"
                    14:07   5   ORBIT EXIT"            8 MIN.
                    14:07       CALP EXIT"
25 MAY 1979         13:47       CALP ENTRY"
                    13:47   4   INTRODUCTION"
                    13:50   4   END OF INTRO."         3 MIN.
                    13:52   5   DIALOG ENTRY"
                    13:58   5   DIALOG EXIT"           6 MIN.
                    13:58   5   ORBIT ENTRY"
                    14:05   5   ORBIT EXIT"            7 MIN.
                    14:07   6   INTRODUCTION"
                    14:08   6   END OF INTRO."         1 MIN.
```

```
                         14:08    6   DIALOG ENTRY"
                         14:19    6   DIALOG EXIT"          11 MIN.
                         14:20    6   ORBIT ENTRY"
                         14:26    6   ORBIT EXIT"            6 MIN.
                         14:27    7   DIALOG ENTRY"
                         14:38    7   DIALOG EXIT"          11 MIN.
                         14:38    7   ORBIT ENTRY"
                         14:45    7   ORBIT EXIT"            7 MIN.
                         14:45        CALP EXIT"
         30 MAY 1979     13:42        CALP ENTRY"
                         13:43    3   ORBIT ENTRY"
                         13:48    3   ORBIT EXIT"            5 MIN.
                         13:48    3   DIALOG ENTRY"
                         13:53    3   DIALOG EXIT"           5 MIN.
                         13:54    4   INTRODUCTION"
                         13:57    4   END OF INTRO."         3 MIN.
                         13:58    4   DIALOG ENTRY"
                         14:03    4   DIALOG EXIT"           5 MIN.
                         14:03    4   ORBIT ENTRY"
                         14:08    4   ORBIT EXIT"            5 MIN.
                         14:09    5   DIALOG ENTRY"
                         14:14    5   DIALOG EXIT"           5 MIN.
                         14:15    5   ORBIT ENTRY"
                         14:22    5   ORBIT EXIT"            7 MIN.
                         14:24    6   ORBIT ENTRY"
                         14:28    6   ORBIT EXIT"            4 MIN.
                         14:28    6   DIALOG ENTRY"
                         14:35    6   DIALOG EXIT"           7 MIN.
                         14:36    7   DIALOG ENTRY"
                         14:46    7   DIALOG EXIT"          10 MIN.
                         14:46    7   ORBIT ENTRY"
                         14:52    7   ORBIT EXIT"            6 MIN.
                         14:53    2   TYMNET ENTRY"
                         14:54    2   TYMNET EXIT"           1 MIN.
                         14:54    2   TELENET ENTRY"
                         14:55    2   TELENET EXIT"          1 MIN.
                         14:56        CALP EXIT"
         31 MAY 1979     15:00        CALP ENTRY"
                         15:00        LINK TO DIALOG
                         15:01    A   DIALOG    ENTRY
                         15:48    A   DIALOG    EXIT      47 MIN.
                                                LOGGED IN:   299 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
121402,250321


         12 FEB 1979     16:38        CALP ENTRY"
                         16:39        CALP EXIT"
         29 MAR 1979     12:42        CALP ENTRY"
                         12:45    1   ENTRY"
                         12:52    1   ABORTED"               7 MIN.
                         12:53        CALP EXIT"
                                                LOGGED IN:    12 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
125640,316700


         21 MAY 1979     13:02        CALP ENTRY"
```

```
                13:03       CALP EXIT"
                                          LOGGED IN:     1 MIN, TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
130500,200031


          06 APR 1979     16:21        CALP ENTRY"
                          16:24   7    ABORT EXIT"
                          16:24        CALP EXIT"
          07 MAY 1979     11:35        CALP ENTRY"
                          11:37        CALP EXIT"
                          11:46        CALP ENTRY"
                          11:47        CALP EXIT"
          09 MAY 1979     12:15        CALP ENTRY"
                          12:16   2    TYMNET ENTRY"
                          12:19   2    TYMNET EXIT"          3 MIN.
                          12:19        CALP EXIT"
                          12:22        CALP ENTRY"
                          12:23   2    TYMNET ENTRY"
                          12:26   2    TYMNET EXIT"          3 MIN.
                          12:27   2    TELENET ENTRY"
                          12:29   2    TELENET EXIT"         2 MIN.
                          12:29   2    TELENET ENTRY"
                          12:31   2    TELENET EXIT"         2 MIN.
                          12:32        LINK TO DIALOG
                          12:32   A    DIALOG    ENTRY
                          12:42        CALP ENTRY"
                          12:44   2    TYMNET ENTRY"
                          12:50   2    TYMNET EXIT"          6 MIN.
                          12:50   2    TELENET ENTRY"
                          12:51   2    TELENET EXIT"         1 MIN.
                          12:52   2    TELENET ENTRY"
                          12:54   2    TELENET EXIT"         2 MIN.
                          12:54        LINK TO DIALOG
                          12:54   A    DIALOG    ENTRY
                          13:03   A    DIALOG    EXIT        9 MIN.
          13 MAY 1979     17:23        CALP ENTRY"
                          17:24   3    ORBIT ENTRY"
                          17:31   3    ORBIT EXIT"           7 MIN.
                          17:32   3    ORBIT ENTRY"
                          17:39   3    DIALOG ENTRY"         7 MIN.
                          17:46   3    DIALOG ABORTED"
                          17:47   4    INTRODUCTION"
                          17:53   4    END OF INTRO."        6 MIN.
                          17:54   4    ORBIT ENTRY"
                          17:58   4    ORBIT EXIT"           4 MIN.
                          17:58   4    DIALOG ENTRY"
                          18:04   4    DIALOG EXIT"          6 MIN.
                          18:04   4    ORBIT ENTRY"
                          18:05   4    ABORT EXIT"           1 MIN.
                          18:06   5    ORBIT ENTRY"
                          18:17   5    ORBIT EXIT"          11 MIN.
                          18:17   5    DIALOG ENTRY"
                          18:25   5    DIALOG EXIT"          8 MIN.
                          18:25        LINK TO DIALOG
                          18:25   A    DIALOG    ENTRY
                          18:27   A    DIALOG    EXIT        2 MIN.
                          18:28   6    INTRODUCTION"
                          18:29   6    END OF INTRO."        1 MIN.
                          18:30    6   ORBIT ENTRY"
                          18:35    6   ABORT EXIT"           5 MIN.
                          18:35    7   ORBIT ENTRY"
                          18:42    7   ORBIT EXIT"           7 MIN.
                          18:43        CALP EXIT"
                          18:45        CALP ENTRY"
                          18:46    6   DIALOG ENTRY"
                          18:53    6   ABORT EXIT"           7 MIN.
                          18:53        LINK TO DIALOG
                          18:53    A   DIALOG    ENTRY
                          19:15    A   DIALOG    EXIT       22 MIN.
           16 MAY 1979    15:40        CALP ENTRY"
                          15:40        LINK TO DIALOG
                          15:40    A   DIALOG    ENTRY
                          15:56    A   DIALOG    EXIT       16 MIN.
                                             LOGGED IN:   167 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
131005,223021


           23 FEB 1979    16:50        CALP ENTRY"
                          16:51    1   ENTRY"
                          16:55    1   ABORTED"              4 MIN.
                          16:56        CALP EXIT"
                          16:57        CALP ENTRY"
                          16:57        CALP EXIT"
                                             LOGGED IN:     6 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
132416,142376


           07 FEB 1979    14:33        CALP ENTRY"
                          14:35        LINK TO DIALOG
                          14:35    A   DIALOG    ENTRY
                          15:34    A   DIALOG    EXIT       59 MIN.
           07 MAR 1979    13:47        CALP ENTRY"
                          13:50    7   ORBIT ENTRY"
                          13:52    7   ABORT EXIT"           2 MIN.
                          13:53        CALP EXIT"
                                             LOGGED IN:    67 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
132416,171202


           22 MAY 1979    12:23        CALP ENTRY"
                          12:26        LINK TO ORBIT E
                          12:31        LINK TO ORBIT E
                          12:36        LINK TO ORBIT F
                                             LOGGED IN:    13 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
132466,263621


           14 MAY 1979    11:52        CALP ENTRY"
                          11:54    5   DIALOG ENTRY"
                          12:02    5   DIALOG EXIT"          8 MIN.
```

```
                            12:02   5   ORBIT ENTRY"
                            12:14   5   ORBIT EXIT"             12 MIN.
                            12:15       CALP EXIT"
                            12:19       CALP ENTRY"
                            12:20   6   INTRODUCTION"
                            12:21   6   END OF INTRO."           1 MIN.
                            12:21   6   DIALOG ENTRY"
                            12:38   6   ABORT EXIT"             17 MIN.
                            12:39   6   DIALOG ENTRY"
                            12:45   6   ABORT EXIT"              6 MIN.
                            12:46   6   ORBIT ENTRY"
                            12:52   6   ORBIT EXIT"              6 MIN.
                            12:52   6   DIALOG ENTRY"
                            12:55   6   ABORT EXIT"              3 MIN.
                            12:56   7   DIALOG ENTRY"
                            13:08   7   DIALOG EXIT"            12 MIN.
                            13:08   7   ORBIT ENTRY"
                            13:18   7   ORBIT EXIT"             10 MIN.
                            13:19       CALP EXIT"
                                                LOGGED IN:    83 MIN, TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
132466,263631


          14 MAY 1979       11:51       CALP ENTRY"
                            11:53   3   DIALOG ENTRY"
                            12:04   3   DIALOG EXIT"            11 MIN.
                            12:05   3   ORBIT ENTRY"
                            12:19   3   ORBIT EXIT"             14 MIN.
                            12:20       LINK TO DIALOG
                            12:20   A   DIALOG    ENTRY
                            12:24   A   DIALOG    EXIT           4 MIN.
                            12:28       CALP ENTRY"
                            12:28       LINK TO DIALOG
                            12:28   A   DIALOG    ENTRY
                            12:37   A   DIALOG    EXIT           9 MIN.
                            12:39       LINK TO ORBIT E
                            12:47       LINK TO ORBIT E
                            12:54   4   INTRODUCTION"
                            13:02   4   END OF INTRO."           8 MIN.
                            13:02   4   DIALOG ENTRY"
                            13:09   4   DIALOG EXIT"             7 MIN.
                            13:10   4   ORBIT ENTRY"
                            13:22       CALP ENTRY"
                            13:23   4   INTRODUCTION"
                            13:23   4   ABORT EXIT"              0 MIN.
                            13:23       CALP EXIT"
          15 MAY 1979       10:36       CALP ENTRY"
                            10:37   5   DIALOG ENTRY"
                            10:49   5   DIALOG ENTRY"
                            10:55   5   DIALOG EXIT"             6 MIN.
                            10:55   5   ORBIT ENTRY"
                            11:05   5   ORBIT EXIT"             10 MIN.
                            11:06   6   INTRODUCTION"
                            11:07   6   END OF INTRO."           1 MIN.
                            11:08   6   DIALOG ENTRY"
                            11:17   6   ABORT EXIT"              9 MIN.
                            11:18   6   DIALOG ENTRY"
                            11:24   6   ABORT EXIT"              6 MIN.
                            11:25    6    ORBIT ENTRY"
                            11:30    6    ORBIT EXIT"           5 MIN.
                            11:30    6    DIALOG ENTRY"
                            11:34    6    ABORT EXIT"           4 MIN.
                            11:34    4    INTRODUCTION"
                            11:40    4    END OF INTRO."        6 MIN.
                            11:40    4    ORBIT ENTRY"
                            11:45    4    ORBIT EXIT"           5 MIN.
                            11:45    4    DIALOG ENTRY"
                            11:51    4    DIALOG EXIT"          6 MIN.
                            11:51    4    ABORT EXIT"
                            11:51         CALP EXIT"
                                                  LOGGED IN:   151 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134003,377304


          11 MAY 1979       14:20         CALP ENTRY"
                            14:22    3    DIALOG ENTRY"
                            14:33    3    DIALOG EXIT"         11 MIN.
                            14:33    3    DIALOG ENTRY"
                            14:39    3    DIALOG EXIT"          6 MIN.
                            14:40         CALP EXIT"
                            14:46         CALP ENTRY"
                            14:47    3    ORBIT ENTRY"
                            14:55    3    ORBIT EXIT"           8 MIN.
                            14:57    3    ORBIT ENTRY"
                            14:57    3    ORBIT ABORTED"        0 MIN.
                            14:58         LINK TO ORBIT E
                            15:04         CALP ENTRY"
                            15:04    4    INTRODUCTION"
                            15:11    4    END OF INTRO."        7 MIN.
                            15:12    4    DIALOG ENTRY"
                            15:19    4    DIALOG EXIT"          7 MIN.
                            15:20    4    ORBIT ENTRY"
                            15:25    4    ORBIT EXIT"           5 MIN.
                            15:26         CALP EXIT"
                                                  LOGGED IN:    54 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134017,102101


          02 FEB 1979       13:04         CALP ENTRY"
                            13:08    3    DIALOG ENTRY"
                            13:14    3    DIALOG EXIT"          6 MIN.
                            13:14    3    DIALOG ENTRY"
                            13:17    3    DIALOG EXIT"          3 MIN.
                            13:18    3    ORBIT ENTRY"
                            13:23    3    ORBIT EXIT"           5 MIN.
                            13:24    3    ORBIT ENTRY"
                            13:27    3    ORBIT EXIT"           3 MIN.
                            13:28         CALP EXIT"
                                                  LOGGED IN:    24 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,010730
```

```
26 APR 1979        16:00          CALP ENTRY"
                   16:01          CALP EXIT"
27 APR 1979        12:47          CALP ENTRY"
                   12:47          CALP EXIT"
                   12:53          CALP ENTRY"
                   12:53     1    ENTRY"
                   12:56     1    ABORTED"                 3 MIN.
                   12:57          CALP EXIT"
                   13:02          CALP ENTRY"
                   13:02     1    ENTRY"
                   13:07     1    ABORTED"                 5 MIN.
                   13:07     1    ENTRY"
                   13:11     1    ABORTED"                 4 MIN.
                   13:11          CALP EXIT"
                   13:15          CALP ENTRY"
                   13:16     2    TYMNET ENTRY"
                   13:19     2    TYMNET EXIT"             3 MIN.
                   13:19     2    TYMNET ENTRY"
                   13:23     2    TYMNET EXIT"             4 MIN.
                   13:24     2    TYMNET ENTRY"
                   13:25     2    TYMNET EXIT"             1 MIN.
                   13:26     2    TELENET ENTRY"
                   13:33     2    TELENET EXIT"            7 MIN.
                   13:33          CALP EXIT"
                   13:38          CALP ENTRY"
                   13:39     2    TELENET ENTRY"
                   13:43     2    TELENET EXIT"            4 MIN.
                   13:43     2    TELENET ENTRY"
                   13:43     2    TELENET EXIT"            0 MIN.
                   13:46     3    DIALOG ENTRY"
                   13:53     3    DIALOG ABORTED"          7 MIN.
                   13:54          CALP EXIT"
                   14:01          CALP ENTRY"
                   14:02     3    DIALOG ENTRY"
                   14:11     3    DIALOG EXIT"             9 MIN.
                   14:12     3    DIALOG ENTRY"
                   14:22     3    DIALOG EXIT"            10 MIN.
                   14:22     3    DIALOG ENTRY"
                   14:30     3    DIALOG EXIT"             8 MIN.
                   14:31     3    DIALOG ENTRY"
                   14:38          CALP EXIT"
28 APR 1979        10:50          CALP ENTRY"
                   10:52     2    TYMNET ENTRY"
                   10:53     2    TYMNET EXIT"             1 MIN.
                   10:54     2    TELENET ENTRY"
                   10:56     2    TELENET EXIT"            2 MIN.
                   10:57     3    DIALOG ENTRY"
                   11:03     3    DIALOG EXIT"             6 MIN.
                   11:04     3    DIALOG ENTRY"
                   11:10     3    DIALOG EXIT"             6 MIN.
                   11:11          LINK TO DIALOG
                   11:11     A    DIALOG     ENTRY
                   11:23     A    DIALOG     EXIT         12 MIN.
                   11:25     A    DIALOG     ENTRY
                   11:31     A    DIALOG     EXIT          6 MIN.
                   11:36          LINK TO DIALOG
                   11:37     A    DIALOG     ENTRY
                   11:55     A    DIALOG     EXIT         18 MIN.
                   11:57     3    ORBIT ENTRY"
                   12:02     3    ORBIT ABORTED"           5 MIN.
```

```
                         12:08    3   ORBIT ENTRY"
                         12:17    3   ORBIT EXIT"           9 MIN.
                         12:18    3   ORBIT ENTRY"
                         12:25    3   ORBIT EXIT"           7 MIN.
                         12:25        LINK TO ORBIT E
                         12:25    B   ORBIT     ENTRY
                         12:42    B   ORBIT     EXIT       17 MIN.
                         12:44        LINK TO ORBIT E
                         12:44    B   ORBIT     ENTRY
                         13:02    B   ORBIT     EXIT       18 MIN.
                         14:07        CALP ENTRY"
                         14:07        LINK TO DIALOG
                         14:07    A   DIALOG    ENTRY
                         14:58    A   DIALOG    EXIT       51 MIN.
                         15:00        LINK TO ORBIT E
                         15:00    B   ORBIT     ENTRY
                         15:06    B   ORBIT     EXIT        6 MIN.
                         16:12    A   DIALOG    ENTRY
                         17:43    A   DIALOG    EXIT       91 MIN.
                         17:44        LINK TO ORBIT E
                         17:44    B   ORBIT     ENTRY
                         18:01    B   ORBIT     EXIT       17 MIN.
                         18:02        LINK TO DIALOG
                         18:02    A   DIALOG    ENTRY
                         18:10    A   DIALOG    EXIT        8 MIN.
          APR 1979       18:47        CALP ENTRY"
                         19:05    B   ORBIT     ENTRY
                         19:20    B   ORBIT     EXIT       15 MIN.
                         19:22        LINK TO DIALOG
                         19:22    A   DIALOG    ENTRY
                         19:54    A   DIALOG    EXIT       32 MIN.
                         19:56    5   DIALOG ENTRY"
                         20:07    5   DIALOG EXIT"         11 MIN.
                         20:07    5   DIALOG ENTRY"
                         20:14    5   DIALOG EXIT"          7 MIN.
                         20:15    5   DIALOG ENTRY"
                         20:20    5   DIALOG EXIT"          5 MIN.
                         20:20        LINK TO DIALOG
                         20:20    A   DIALOG    ENTRY
                         20:28    A   DIALOG    EXIT        8 MIN.
                                            LOGGED IN:   561 MIN. TOT
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,020732


       02 MAY 1979       15:43        CALP ENTRY"
                         15:46        CALP FXIT"
                         15:47        CALP ENTRY"
                         15:49        CALP EXIT"
       29 MAY 1979       11:25        CALP ENTRY"
                         11:26    3   DIALOG ENTRY"
                         11:35    3   DIALOG EXIT"          9 MIN.
                         11:36    3   DIALOG ENTRY"
                         11:44    3   DIALOG EXIT"          8 MIN.
                         11:45    3   ORBIT ENTRY"
                         11:53    3   ORBIT EXIT"           8 MIN.
                         11:55    4   INTRODUCTION"
                         12:00    4   END OF INTRO."        5 MIN.
                         12:00    4   DIALOG ENTRY"
```

```
                          12:06   4   DIALOG EXIT"           6 MIN.
                          12:07   4   ORBIT ENTRY"
                          12:11   4   ORBIT EXIT"            4 MIN.
                          12:11       CALP EXIT"
                          12:14       CALP ENTRY"
                          12:15       LINK TO DIALOG
                          12:15   A   DIALOG    ENTRY
                          12:48   A   DIALOG     EXIT       33 MIN.
                          12:51   5   SCORPIO ENTRY"
                          12:54   5   SCORPIO EXIT"          3 MIN.
                          12:54   5   DIALOG ENTRY"
                          13:01   5   DIALOG EXIT"           7 MIN.
                          13:01   5   ORBIT ENTRY"
                          13:11   5   ORBIT EXIT"           10 MIN.
                          13:11   6   INTRODUCTION"
                          13:12   6   END OF INTRO."         1 MIN.
                          13:13   6   ORBIT ENTRY"
                          13:20   6   ORBIT EXIT"            7 MIN.
                          13:20   6   DIALOG ENTRY"
                          13:28   6   DIALOG EXIT"           8 MIN.
                          13:29   7   ORBIT ENTRY"
                                             LOGGED IN:   126 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,030734


           03 MAY 1979    14:09       CALP ENTRY"
                          14:19       LINK TO ORBIT E
                          14:19   8   ORBIT     ENTRY
                          14:26   8   ORBIT      EXIT        7 MIN.
                          14:28   3   ORBIT ENTRY"
                          14:38   3   ORBIT ABORTED"        10 MIN.
                          14:38   3   ORBIT ENTRY"
                          14:41   3   ORBIT ABORTED"         3 MIN.
                          14:42       CALP EXIT"
           08 MAY 1979     8:13       CALP ENTRY"
                           8:16   3   ORBIT ENTRY"
                           8:18   3   ORBIT ABORTED"         2 MIN.
                           8:18       CALP EXIT"
           09 MAY 1979     8:21       CALP ENTRY"
                           8:23       CALP EXIT"
           10 MAY 1979     8:10       CALP ENTRY"
                           8:15   3   ORBIT ENTRY"
                           8:25   3   ORBIT EXIT"           10 MIN.
                           8:25       CALP EXIT"
           11 MAY 1979     8:04       CALP ENTRY"
                           8:09   5   DIALOG ENTRY"
                           8:21   5   DIALOG EXIT"          12 MIN.
                           8:22       CALP EXIT"
           14 MAY 1979     8:07       CALP ENTRY"
                           8:09   6   DIALOG ENTRY"
                           8:17   6   ABORT EXIT"            8 MIN.
                           8:17       CALP EXIT"
           15 MAY 1979     8:08       CALP ENTRY"
                           8:08   6   INTRODUCTION"
                           8:09   6   END OF INTRO."         1 MIN.
                           8:10   6   DIALOG ENTRY"
                           8:16   6   ABORT EXIT"            6 MIN.
                           8:16       CALP EXIT"
```

```
          16 MAY 1979       7:58         CALP ENTRY"
                            7:59    6    DIALOG ENTRY"
                            8:11    6    ABORT EXIT"         12 MIN.
                            8:12         CALP EXIT"
                            8:17         CALP ENTRY"
                            8:18    6    DIALOG ENTRY"
                            8:24    6    ABORT EXIT"          6 MIN.
                            8:24         CALP EXIT"
          18 MAY 1979       8:14         CALP ENTRY"
                            8:16    6    DIALOG ENTRY"
                            8:21    6    ABORT EXIT"          5 MIN.
                            8:21         CALP EXIT"
                                                   LOGGED IN:   119 MIN. TOT.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX:
134057,040736


          01 MAR 1979       11:44        CALP ENTRY"
                            11:48        LINK TO DIALOG
                            11:48   A    DIALOG    ENTRY
                                                   LOGGED IN:     4 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,070744


          03 MAY 1979      13:23         CALP ENTRY"
                           13:23         CALP EXIT"
                                                   LOGGED IN:     0 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,100746


          15 MAY 1979      11:42         CALP ENTRY"
                           11:44         CALP EXIT"
          17 MAY 1979      12:37         CALP ENTRY"
                           12:43    3    DIALOG ENTRY"
                           12:53    3    DIALOG ABORTED"     10 MIN.
                           12:53    3    DIALOG ENTRY"
                           13:05    3    DIALOG EXIT"        12 MIN.
                           13:06         CALP EXIT"
                           18:51         CALP ENTRY"
                           16:49         CALP ENTRY"
                           16:54    1    ENTRY"
                           16:58    1    ABORTED"             4 MIN.
                           16:58         CALP EXIT"
          21 MAY 1979      16:23         CALP ENTRY"
                           16:26    2    TYMNET ENTRY"
                           16:31    2    TYMNET EXIT"         5 MIN.
                           16:32         CALP EXIT"
                                                   LOGGED IN:    49 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,110652


          23 MAY 1979      13:22         CALP ENTRY"
                           13:25    1    ENTRY"
```

```
                         13:29    1    EXIT"                    4 MIN.
                         13:30    2    TYMNET ENTRY"
                         13:32    2    TYMNET EXIT"             2 MIN.
                         13:32    2    TELENET ENTRY"
                         13:34    2    TELENET EXIT"            2 MIN.
                         13:34    2    TYMNET ENTRY"
                         13:35    2    TYMNET EXIT"             1 MIN.
                         13:36    2    TELENET ENTRY"
                         13:36    2    TELENET EXIT"            0 MIN.
                         13:36    2    TYMNET ENTRY"
                         13:37    2    TYMNET EXIT"             1 MIN.
                         13:37    2    TELENET ENTRY"
                         13:38    2    TELENET EXIT"            1 MIN.
                         13:38    1    ENTRY"
                         13:43    1    EXIT"                    5 MIN.
                         13:43    1    ENTRY"
                         13:48    1    EXIT"                    3 MIN.
                         13:47    2    TYMNET ENTRY"
                         13:48    2    TYMNET EXIT"             1 MIN.
                         13:48    2    TELENET ENTRY"
                         13:49    2    TELENET EXIT"            1 MIN.
                         13:49         CALP EXIT"
       24 MAY 1979       13:59         CALP ENTRY"
                         14:01    1    ENTRY"
                         14:04    1    EXIT"                    3 MIN.
                         14:05    2    TYMNET ENTRY"
                         14:05    2    TYMNET EXIT"             0 MIN.
                         14:06    2    TELENET ENTRY"
                         14:06    2    TELENET EXIT"            0 MIN.
                         14:07    3    DIALOG ENTRY"
                         14:16    3    DIALOG EXIT"             9 MIN.
                         14:16    3    DIALOG ENTRY"
                         14:22    3    DIALOG EXIT"             6 MIN.
                         14:23    3    ORBIT ENTRY"
                         14:30    3    ORBIT EXIT"              7 MIN.
                         14:30    1    ENTRY"
                         14:33    1    EXIT"                    3 MIN.
                         14:34         CALP EXIT"
       31 MAY 1979       15:13         CALP ENTRY"
                         15:14    1    ENTRY"
                         15:17    1    EXIT"                    3 MIN.
                         15:18    2    TYMNET ENTRY"
                         15:18    2    TYMNET EXIT"             0 MIN.
                         15:18    2    TELENET ENTRY"
                         15:19    2    TELENET EXIT"            1 MIN.
                         15:20    3    DIALOG ENTRY"
                         15:26    3    DIALOG EXIT"             6 MIN.
                         15:26    3    ORBIT ENTRY"
                         15:33    3    ORBIT EXIT"              7 MIN.
                         15:33    4    INTRODUCTION"
                         15:39    4    END OF INTRO."           6 MIN.
                         15:39    4    DIALOG ENTRY"
                         15:45    4    DIALOG EXIT"             6 MIN.
                         15:46         CALP EXIT"
                                                  LOGGED IN:    95 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,110750
```

```
24 MAY 1979    14:24          CALP ENTRY"
               14:25    1     ENTRY"
25 MAY 1979    15:14          CALP ENTRY"
               15:15    1     ENTRY"
               15:21    1     EXIT"                     6 MIN.
               15:22    2     TYMNET ENTRY"
               15:25    2     TYMNET EXIT"              3 MIN.
               15:25    2     TYMNET ENTRY"
               15:27    2     TYMNET EXIT"              2 MIN.
               15:28    2     TELENET ENTRY"
               15:32    2     TELENET EXIT"             4 MIN.
               15:32    2     TELENET ENTRY"
               15:33    2     TELENET EXIT"             1 MIN.
               15:34    3     DIALOG ENTRY"
               15:42    3     DIALOG EXIT"              8 MIN.
               15:42    3     ORBIT ENTRY"
               15:48    3     ORBIT EXIT"               6 MIN.
               15:48          CALP EXIT"
29 MAY 1979    13:12          CALP ENTRY"
               13:14    2     TYMNET ENTRY"
               13:15    2     TYMNET EXIT"              1 MIN.
               13:15    2     TELENET ENTRY"
               13:19    2     TELENET EXIT"             4 MIN.
               13:19          CALP EXIT"
30 MAY 1979    11:49          CALP ENTRY"
               11:49    1     ENTRY"
               11:55    1     EXIT"                     6 MIN.
               11:56    2     TYMNET ENTRY"
               11:57    2     TYMNET EXIT"              1 MIN.
               11:57    2     TYMNET ENTRY"
               11:58    2     TYMNET EXIT"              1 MIN.
               11:58    2     TELENET ENTRY"
               11:59    2     TELENET EXIT"             1 MIN.
               12:00    2     TELENET ENTRY"
               12:00    2     TELENET EXIT"             0 MIN.
               12:01    3     DIALOG ENTRY"
               12:09    3     DIALOG EXIT"              8 MIN.
               12:10    3     ORBIT ENTRY"
               12:15    3     ORBIT EXIT"               5 MIN.
               12:15          CALP EXIT"
01 JUN 1979    14:41          CALP ENTRY"
               14:42    4     INTRODUCTION"
               14:45    4     END OF INTRO."            3 MIN.
               14:48          CALP EXIT"
                                          LOGGED IN:    73 MIN. TOT
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,120121


09 FEB 1979    10:58          CALP ENTRY"
               10:59          LINK TO DIALOG
               10:59    A     DIALOG     ENTRY
               11:05    A     DIALOG     EXIT           6 MIN.
               11:15    B     ORBIT      ENTRY
               11:19    B     ORBIT      EXIT           4 MIN.
12 FEB 1979    16:04          CALP ENTRY"
               16:04    1     ENTRY"
               16:04    1     ABORTED"                  0 MIN.
               16:05    3     DIALOG ENTRY"
```

```
                  16:06   3   DIALOG ABORTED"      1 MIN.
                  16:06   3   ORBIT ENTRY"
                  16:06   3   ORBIT ABORTED"       0 MIN.
                  16:07   4   GENERAL ENTRY"
                  16:07   4   EXIT"                0 MIN.
                  16:07   5   ABORT EXIT"
                  16:08   6   ABORT EXIT"
                  16:08   7   ENTRY"
                  16:08   7   ABORT EXIT"          0 MIN.
                  16:08       CALP EXIT"
16 APR 1979       10:21       CALP ENTRY"
21 APR 1979       18:42       CALP ENTRY"
                  18:42       LINK TO DIALOG
                  18:42   A   DIALOG    ENTRY
                  18:43   A   DIALOG    EXIT       1 MIN.
10 MAY 1979       21:41       CALP ENTRY"
                  21:44   3   DIALOG ENTRY"
                  21:48   3   DIALOG ABORTED"      4 MIN.
                  21:48       LINK TO DIALOG
                  21:48   A   DIALOG    ENTRY
                  21:52   A   DIALOG    EXIT       4 MIN.
17 MAY 1979       18:48       CALP ENTRY"
                  18:49       CALP EXIT"
                  21:59       CALP ENTRY"
                  22:00   1   ENTRY"
                  22:08   1   ABORTED"             8 MIN.
                  22:09   3   DIALOG ENTRY"
                  22:21   3   DIALOG EXIT"        12 MIN.
                  22:22   3   ORBIT ENTRY"
                  22:32       CALP ENTRY"
                  22:32       LINK TO ORBIT E
                  22:33   B   ORBIT     ENTRY
                  22:33   3   ORBIT EXIT"
                  22:34   3   DIALOG ENTRY"        1 MIN.
                  22:35   B   ORBIT     EXIT
                  22:36   7   ORBIT ENTRY"
                  22:42   3   DIALOG EXIT"
                  22:44   7   ORBIT EXIT"
                  22:45   7   DIALOG ENTRY"        1 MIN.
                  22:45   3   DIALOG ENTRY"
                  22:48   7   ABORT EXIT"
                  22:50   6   INTRODUCTION"
                  22:50   6   END OF INTRO."       0 MIN.
                  22:51   6   ORBIT ENTRY"
                  22:52   3   DIALOG ABORTED"
                  22:53   3   DIALOG ENTRY"        1 MIN.
                  22:57   6   ORBIT EXIT"
                  22:58   7   ABORT EXIT"
                  22:59       CALP EXIT"
                  23:00       LINK TO ORBIT E
                  23:00   B   ORBIT     ENTRY
                  23:06   B   ORBIT     EXIT       6 MIN.
19 MAY 1979       15:41       CALP ENTRY"
                  15:43   3   DIALOG ENTRY"
                  15:52   3   DIALOG EXIT"         9 MIN.
                  15:53       LINK TO DIALOG
                  15:53   A   DIALOG    ENTRY
                  16:15   A   DIALOG    EXIT      22 MIN.
                  16:17   6   INTRODUCTION"
                  16:18   6   END OF INTRO."       1 MIN.
```

```
                          16:18    6    DIALOG ENTRY"
                          16:32    6    ABORT EXIT"          14 MIN.
                          16:32         CALP EXIT"
                          16:35         CALP ENTRY"
                          16:35         LINK TO ORBIT E
                          16:35    B    ORBIT      ENTRY
                          16:47    B    ORBIT      EXIT      12 MIN.
                          16:52         CALP ENTRY"
                          16:56    3    DIALOG ENTRY"
                          17:09    3    DIALOG EXIT"         13 MIN.
                          17:10    3    DIALOG ENTRY"
                          17:16    3    DIALOG ABORTED"       6 MIN.
                          17:16    3    DIALOG ENTRY"
                          17:22    3    DIALOG EXIT"          6 MIN.
                          17:28    7    ABORT EXIT"
                          17:28         CALP EXIT"
                                                 LOGGED IN:   194 MIN. TOT.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,120654


             21 MAY 1979  13:30         CALP ENTRY"
                          13:30         CALP EXIT"
             22 MAY 1979  12:54         CALP ENTRY"
                          12:54    1    ENTRY"
                          12:59    1    EXIT"                 5 MIN.
                          13:03    3    DIALOG ENTRY"
                          13:14    3    DIALOG ABORTED"      11 MIN.
                          13:15    3    DIALOG ENTRY"
                          13:25    3    DIALOG ABORTED"      10 MIN.
                          13:26    3    ORBIT ENTRY"
                          13:36    3    ORBIT ABORTED"       10 MIN.
                          13:37    4    INTRODUCTION"
                          13:43    4    END OF INTRO."        6 MIN.
                          13:44    4    ORBIT ENTRY"
                          13:50    4    ORBIT EXIT"           6 MIN.
                          13:51    5    ORBIT ENTRY"
                          13:58    5    ABORT EXIT"           7 MIN.
                          13:58         CALP EXIT"
                                                 LOGGED IN:    64 MIN. TOT.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,140756


             01 FEB 1979   8:12         CALP ENTRY"
                           8:13    4    GENERAL ENTRY"
                           8:49         CALP ENTRY"
                           8:49    4    GENERAL ENTRY"
                           8:54    4    DIALOG ENTRY"          5 MIN.
                           9:34         CALP ENTRY"
                           9:35    4    GENERAL ENTRY"
                           9:51         CALP ENTRY"
                           9:52    4    GENERAL ENTRY"
                           9:56    4    DIALOG ENTRY"          4 MIN.
                          10:06    4    EXIT"
             02 FEB 1979   8:10         CALP ENTRY"
                           8:10         LINK TO DIALOG
                           8:10    A    DIALOG      ENTRY
```

```
                                9:28      CALP ENTRY"
                                9:28      LINK TO DIALOG
                                9:28   A  DIALOG    ENTRY
                                9:42      CALP ENTRY"
                                9:43   5  DIALOG ENTRY"
                               14:23      CALP ENTRY"
                               14:25   5  DIALOG ENTRY"
                               14:33   5  DIALOG EXIT"            8 MIN.
                               14:35   5  DIALOG ENTRY"
                               14:35   5  ABORT EXIT"             0 MIN.
                               14:35      LINK TO DIALOG
                               14:35   A  DIALOG    ENTRY
                               15:40      CALP ENTRY"
                               15:40      LINK TO DIALOG
                               15:40   A  DIALOG    ENTRY
                               15:49   A  DIALOG    EXIT          9 MIN.
           03 FEB 1979         10:04      CALP ENTRY"
                               10:07      LINK TO DIALOG
                               10:07   A  DIALOG    ENTRY
                               10:17   A  DIALOG    ENTRY
                               10:23   A  DIALOG    ENTRY
                               10:34   A  DIALOG    ENTRY
                               10:44   A  DIALOG    ENTRY
                               11:00   A  DIALOG    ENTRY
                               11:01   A  DIALOG    ENTRY
                               11:15   A  DIALOG    ENTRY
                               11:51   A  DIALOG    ENTRY
                               11:55   A  DIALOG    ENTRY
           04 FEB 1979         14:05      CALP ENTRY"
                               14:06      LINK TO DIALOG
                               14:06   A  DIALOG    ENTRY
                               14:37   A  DIALOG    ENTRY
                               15:35   A  DIALOG    ENTRY
                                                 LOGGED IN:   243 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,152461


           23 FEB 1979         16:30      CALP ENTRY"
                               16:31   2  TYMNET ENTRY"
                               16:36   2  TYMNET EXIT"            5 MIN.
                               16:37   3  DIALOG ENTRY"
                               16:50   3  DIALOG EXIT"           13 MIN.
                               16:51   3  DIALOG ENTRY"
                               17:08   3  DIALOG EXIT"           17 MIN.
                               17:08      LINK TO DIALOG
                               17:08   A  DIALOG    ENTRY
                               17:14   A  DIALOG    EXIT          6 MIN.
                               17:21      CALP ENTRY"
                               17:21      LINK TO DIALOG
                               17:21   A  DIALOG    ENTRY
                               17:42   A  DIALOG    EXIT         21 MIN.
           24 FEB 1979         12:59      CALP ENTRY"
                               13:00      LINK TO DIALOG
                               13:00   A  DIALOG    ENTRY
                               13:06   A  DIALOG    EXIT          6 MIN.
                               13:09   4  INTRODUCTION"
                               13:18   4  END OF INTRO."          9 MIN.
                               13:18   4  DIALOG ENTRY"
```

```
                              13:25   4   DIALOG EXIT*          7 MIN.
                              13:25   4   DIALOG ENTRY*
                              13:28   4   DIALOG EXIT*          3 MIN.
                              13:29   4   DIALOG ENTRY*
                              13:30   4   ABORT EXIT*           1 MIN.
                              13:30       LINK TO DIALOG
                              13:30   A   DIALOG    ENTRY
                              13:33   A   DIALOG    EXIT        3 MIN.
                              13:37   5   DIALOG ENTRY*
                              13:48   5   DIALOG EXIT*         11 MIN.
                              13:48   5   DIALOG ENTRY*
                              13:48   5   ABORT EXIT*           0 MIN.
                              13:49   6   INTRODUCTION*
                              13:50   6   END OF INTRO.*        1 MIN.
                              13:51   6   DIALOG ENTRY*
                              13:57   6   DIALOG EXIT*          6 MIN.
                              13:57   6   INTRODUCTION*
                              13:58   6   END OF INTRO.*        1 MIN.
                              13:59   7   DIALOG ENTRY*
                              14:13       CALP ENTRY*
                              14:14   7   DIALOG ENTRY*
                              14:21   7   DIALOG EXIT*          7 MIN.
                              14:22       LINK TO DIALOG
                              14:22   A   DIALOG    ENTRY
                              15:09   A   DIALOG    ENTRY
                              15:12   A   DIALOG    EXIT        3 MIN.
                                                      LOGGED IN:   184 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,152521


             23 FEB 1979      13:50       CALP ENTRY*
                              13:52   2   TYMNET ENTRY*
                              13:59   2   TYMNET EXIT*          7 MIN.
                              14:00   2   TELENET ENTRY*
                              14:01   2   TELENET EXIT*         1 MIN.
                              14:02   2   TYMNET ENTRY*
                              14:04   2   TYMNET EXIT*          2 MIN.
                              14:04   2   TELENET ENTRY*
                              14:05   2   TELENET EXIT*         1 MIN.
                              14:05   2   TYMNET ENTRY*
                              14:06   2   TYMNET EXIT*          1 MIN.
                              14:07   3   DIALOG ENTRY*
                              14:14   3   DIALOG EXIT*          7 MIN.
                              14:14   3   ORBIT ENTRY*
                              14:18   3   ORBIT EXIT*           4 MIN.
                              14:19   3   DIALOG ENTRY*
                              14:24   3   DIALOG EXIT*          5 MIN.
                              14:24   3   ORBIT ENTRY*
                              14:29   3   ORBIT EXIT*           5 MIN.
                              14:31       LINK TO DIALOG
                              14:31   A   DIALOG    ENTRY
                              14:44   A   DIALOG    EXIT       13 MIN.
                              17:11       CALP ENTRY*
                              17:11   4   INTRODUCTION*
                              17:12   4   ABORT EXIT*           1 MIN.
                              17:13       LINK TO DIALOG
                              17:13   A   DIALOG    ENTRY
                              17:13   A   DIALOG    EXIT        0 MIN.
```

```
                     17:14   4   INTRODUCTION"
                     17:17   4   END OF INTRO."          3 MIN.
                     17:17   4   DIALOG ENTRY"
                     17:21   4   DIALOG EXIT"            4 MIN.
                     17:22   4   ORBIT ENTRY"
                     17:26   4   ORBIT EXIT"             4 MIN.
                     17:26   4   ABORT EXIT"
                     17:26       LINK TO DIALOG
                     17:26   A   DIALOG    ENTRY
                     17:30   A   DIALOG    EXIT          4 MIN.
                     19:09       CALP ENTRY"
                     19:10       LINK TO DIALOG
                     19:10   A   DIALOG    ENTRY
                     19:23   A   DIALOG    EXIT         13 MIN.
04 MAR 1979          17:42       CALP ENTRY"
                     17:43       LINK TO DIALOG
                     17:43   A   DIALOG    ENTRY
                     17:47   A   DIALOG    EXIT          4 MIN.
                     17:48   3   DIALOG ENTRY"
                     17:50   3   DIALOG ABORTED"         2 MIN.
                     17:50       LINK TO DIALOG
                     17:50   A   DIALOG    ENTRY
                     17:53   A   DIALOG    EXIT          3 MIN.
12 MAR 1979          10:01       CALP ENTRY"
                     10:01       LINK TO DIALOG
                     10:01   A   DIALOG    ENTRY
                     10:16   A   DIALOG    EXIT         15 MIN.
                     10:19       LINK TO ORBIT E
                     10:19   B   ORBIT     ENTRY
                     10:23   B   ORBIT     EXIT          4 MIN.
                     10:25   4   INTRODUCTION"
                     10:30   4   END OF INTRO."          5 MIN.
                     10:30   4   ORBIT ENTRY"
                     10:36   4   ORBIT EXIT"             6 MIN.
                     10:37   4   DIALOG ENTRY"
                     10:42   4   DIALOG EXIT"            5 MIN.
                     10:43   4   ABORT EXIT"
                     10:43       LINK TO ORBIT E
                     10:43   B   ORBIT     ENTRY
                     10:44   B   ORBIT     EXIT          1 MIN.
                     10:52       LINK TO ORBIT E
                     10:52   B   ORBIT     ENTRY
                     10:52   B   ORBIT     EXIT          0 MIN.
                     10:53       LINK TO DIALOG
                     10:53   A   DIALOG    ENTRY
                     11:02   A   DIALOG    EXIT          9 MIN.
13 MAR 1979          11:07       CALP ENTRY"
                     11:08       LINK TO ORBIT E
                     11:08   B   ORBIT     ENTRY
                     11:11   B   ORBIT     EXIT          3 MIN.
14 MAR 1979          22:18       CALP ENTRY"
                     22:18       LINK TO ORBIT E
                     22:18   B   ORBIT     ENTRY
                     22:19   B   ORBIT     EXIT          1 MIN.
                     22:21   4   INTRODUCTION"
                     22:24   4   END OF INTRO."          3 MIN.
                     22:24   4   DIALOG ENTRY"
                     22:30   4   DIALOG EXIT"            6 MIN.
                     22:31       CALP EXIT"
23 MAR 1979          10:42       CALP ENTRY"
```

```
                    14:42         LINK TO DIALOG
                    14:42    A    DIALOG     ENTRY
                    14:47    A    DIALOG     EXIT          5 MIN.
                    14:48         LINK TO ORBIT E
                    14:48    B    ORBIT      ENTRY
                    14:48    B    ORBIT      EXIT          0 MIN.
    02 MAY 1979     12:32         CALP ENTRY"
                    12:32    4    INTRODUCTION"
                    12:37    4    END OF INTRO."           5 MIN.
                    12:37    4    DIALOG ENTRY"
                    12:42    4    DIALOG EXIT"             5 MIN.
                    12:43    4    ABORT EXIT"
                    12:44    5    DIALOG ENTRY"
                    12:51    5    DIALOG EXIT"             7 MIN.
                    12:51    5    DIALOG ENTRY"
    03 MAY 1979     13:24         CALP ENTRY"
                    13:25    4    INTRODUCTION"
                    13:29    4    END OF INTRO."           4 MIN.
                    13:29    4    DIALOG ENTRY"
                    13:33    4    DIALOG EXIT"             4 MIN.
                    13:34    4    ABORT EXIT"
                    13:36    5    DIALOG ENTRY"
                    13:42    5    DIALOG EXIT"             6 MIN.
                    13:43         LINK TO DIALOG
                    13:43    A    DIALOG     ENTRY
                    14:35    A    DIALOG     EXIT         52 MIN.
                                           LOGGED IN:   272 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,174671


    23 FEB 1979     16:59         CALP ENTRY"
                    17:01    2    TYMNET ENTRY"
                    17:03    2    TYMNET EXIT"             2 MIN.
                    17:04    2    TELENFT ENTRY"
                    17:06    2    TELENET EXIT"            2 MIN.
                    17:07    3    DIALOG ENTRY"
                    17:15    3    DIALOG EXIT"             8 MIN.
                    17:15    3    DIALOG ENTRY"
                    17:16    3    DIALOG ABORTED"          1 MIN.
                    17:18         CALP EXIT"
                    19:48         CALP ENTRY"
                    19:49    3    DIALOG ENTRY"
                    19:54    3    DIALOG EXIT"             5 MIN.
                    19:55    3    DIALOG ENTRY"
                    19:56    3    DIALOG ABORTED"          1 MIN.
                    19:57         LINK TO DIALOG
                    19:57    A    DIALOG     ENTRY
                    19:59    A    DIALOG     EXIT          2 MIN.
                    20:02         LINK TO DIALOG
                    20:02    A    DIALOG     ENTRY
                    20:14    A    DIALOG     EXIT         12 MIN.
                    20:16         LINK TO DIALOG
                    20:16    A    DIALOG     ENTRY
                    20:27    A    DIALOG     EXIT         11 MIN.
                    20:28    4    INTRODUCTION"
                    20:33    4    END OF INTRO."           5 MIN.
                    20:34    4    DIALOG ENTRY"
                    20:40    4    DIALOG EXIT"             6 MIN.
```

```
                      20:41          LINK TO DIALOG
                      20:41     A    DIALOG     ENTRY
                      20:52     A    DIALOG     EXIT       11 MIN.
                      20:53     4    INTRODUCTION"
                      20:57     4    END OF INTRO."         4 MIN.
                      20:57     4    DIALOG ENTRY"
                      21:05     4    DIALOG EXIT"           8 MIN.
                      21:06          CALP EXIT"
    27 FEB 1979       20:37          CALP ENTRY"
                      20:39     5    DIALOG ENTRY"
                      20:46     5    DIALOG EXIT"           7 MIN.
                      20:46     5    DIALOG ENTRY"
                      20:47     5    ABORT EXIT"            1 MIN.
                      20:47     4    INTRODUCTION"
                      20:51     4    END OF INTRO."         4 MIN.
                      20:52     4    DIALOG ENTRY"
                      20:57     4    DIALOG EXIT"           5 MIN.
                      20:58          LINK TO DIALOG
                      20:58     A    DIALOG     ENTRY
                      21:28     A    DIALOG     EXIT       30 MIN.
    28 FEB 1979       17:46          CALP ENTRY"
                      17:47     6    INTRODUCTION"
                      17:48     6    END OF INTRO."         1 MIN.
                      17:48     6    DIALOG ENTRY"
                      17:57     6    DIALOG EXIT"           9 MIN.
                      17:58     5    DIALOG ENTRY"
                      18:03     5    ABORT EXIT"            5 MIN.
                      18:03          CALP EXIT"
    01 MAR 1979       18:31          CALP ENTRY"
                      18:31     7    DIALOG ENTRY"
                      18:46     7    DIALOG EXIT"          15 MIN.
                      18:48          LINK TO DIALOG
                      18:48     A    DIALOG     ENTRY
                      19:03     A    DIALOG     EXIT       15 MIN.
    05 MAR 1979       20:44          CALP ENTRY"
                      20:45          LINK TO DIALOG
                      20:45     A    DIALOG     ENTRY
                      21:13     A    DIALOG     EXIT       28 MIN.
    06 MAR 1979       12:31          CALP ENTRY"
                      12:31          LINK TO DIALOG
                      12:31     A    DIALOG     ENTRY
                      12:47     A    DIALOG     EXIT       16 MIN.
                      20:35          CALP ENTRY"
                      20:36     3    DIALOG ENTRY"
                      20:41     3    DIALOG EXIT"           5 MIN.
                      20:41     4    INTRODUCTION"
                      20:45     4    END OF INTRO."         4 MIN.
                      20:46     4    DIALOG ENTRY"
                      20:48     4    DIALOG EXIT"           2 MIN.
                      20:49     5    DIALOG ENTRY"
                      20:55     5    DIALOG EXIT"           6 MIN.
                      20:57     6    INTRODUCTION"
                      20:58     6    END OF INTRO."         1 MIN.
                      20:58     6    DIALOG ENTRY"
                      21:03     6    DIALOG EXIT"           5 MIN.
                      21:04     7    DIALOG ENTRY"
                      21:13     7    DIALOG EXIT"           9 MIN.
                      21:14     1    ENTRY"
                      21:17     1    EXIT"                  3 MIN.
                      21:17          CALP EXIT"
```

```
07 MAR 1979     17:46          CALP ENTRY"
                17:46          LINK TO DIALOG
                17:46     A    DIALOG     ENTRY
                18:21     A    DIALOG     EXIT          35 MIN.
                20:26          CALP ENTRY"
                20:26          LINK TO DIALOG
                20:26     A    DIALOG     ENTRY
                20:43     A    DIALOG     EXIT          17 MIN.
                20:44          LINK TO DIALOG
                20:44     A    DIALOG     ENTRY
                21:04     A    DIALOG     EXIT          20 MIN.
                21:06          LINK TO DIALOG
                21:06     A    DIALOG     ENTRY
                21:15     A    DIALOG     EXIT           9 MIN.
12 MAR 1979     20:28          CALP ENTRY"
                20:28          LINK TO DIALOG
                20:28     A    DIALOG     ENTRY
                20:30     A    DIALOG     EXIT           2 MIN.
                20:30     3    ORBIT ENTRY"
                20:37     3    ORBIT EXIT"               7 MIN.
                20:38     4    INTRODUCTION"
                20:41     4    END OF INTRO."            3 MIN.
                20:41     4    ORBIT ENTRY"
                20:46     4    ORBIT EXIT"               5 MIN.
                20:47          LINK TO ORBIT E
                20:47     B    ORBIT      ENTRY
                20:48     B    ORBIT      EXIT           1 MIN.
16 MAR 1979     18:28          CALP ENTRY"
                18:29     3    DIALOG ENTRY"
                18:33     3    DIALOG ABORTED"           4 MIN.
                18:34     4    INTRODUCTION"
                18:36     4    END OF INTRO."            2 MIN.
                18:36     4    DIALOG ENTRY"
                18:40     4    DIALOG EXIT"              4 MIN.
                18:40     4    ABORT EXIT"
                18:41     5    DIALOG ENTRY"
                18:45     5    DIALOG EXIT"              4 MIN.
                18:46     6    DIALOG ENTRY"
                18:50     6    DIALOG EXIT"              4 MIN.
                18:51     7    DIALOG ENTRY"
                18:57     7    DIALOG EXIT"              6 MIN.
                18:58          CALP EXIT"
20 MAR 1979     19:00          CALP ENTRY"
                19:01     3    ORBIT ENTRY"
                19:06     3    ORBIT EXIT"               5 MIN.
                19:06     4    INTRODUCTION"
                19:09     4    END OF INTRO."            3 MIN.
                19:09     4    ORBIT ENTRY"
                19:14     4    ORBIT EXIT"               5 MIN.
                19:14     4    ABORT EXIT"
                19:15     5    ORBIT ENTRY"
                19:23     5    ORBIT EXIT"               8 MIN.
                19:24          CALP EXIT"
21 MAR 1979     18:39          CALP ENTRY"
                18:40          CALP EXIT"
                18:45          CALP ENTRY"
                18:46          CALP EXIT"
                18:47          CALP ENTRY"
                18:47          CALP EXIT"
                18:50          CALP ENTRY"
```

```
                         18:51     5   ORBIT ENTRY"
                         18:57     5   ORBIT EXIT"           6 MIN.
                         18:58     6   ORBIT ENTRY"
                         19:01     6   ORBIT EXIT"           3 MIN.
                         19:01     7   ORBIT ENTRY"
                         19:06     7   ORBIT EXIT"           5 MIN.
                         19:07         CALP EXIT"
           02 APR 1979   18:22         CALP ENTRY"
                         18:23         LINK TO DIALOG
                         18:23     A   DIALOG    ENTRY
                         19:09     A   DIALOG    EXIT     46 MIN.
                                                  LOGGED IN:   508 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,224270


           28 FEB 1979   19:36         CALP ENTRY"
                         19:37     1   ENTRY"
                         19:41     1   ENTRY"
                         19:47     1   ABORTED"              6 MIN.
                         19:49     2   TYMNET ENTRY"
                         19:52     2   TYMNET EXIT"          3 MIN.
                         19:53     2   TELENET ENTRY"
                         19:56     2   TELENET EXIT"         3 MIN.
                         19:57     3   ORBIT ENTRY"
                         20:07     3   ORBIT EXIT"          10 MIN.
                         20:08         CALP EXIT"
           02 MAR 1979   16:24         CALP ENTRY"
                         16:25     4   INTRODUCTION"
                         16:26     4   ABORT EXIT"           1 MIN.
                         16:26         CALP EXIT"
           10 MAR 1979   16:10         CALP ENTRY"
                         16:12     2   TYMNET ENTRY"
                         16:14     2   TYMNET EXIT"          2 MIN.
                         16:14     2   TELENET ENTRY"
                         16:15     2   TELENET EXIT"         1 MIN.
                         16:17     3   ORBIT ENTRY"
                         16:25     3   ORBIT EXIT"           8 MIN.
                         16:27         CALP EXIT"
                                                  LOGGED IN:    51 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,234272


           24 FEB 1979   14:21         CALP ENTRY"
                         14:24     1   ENTRY"
                         14:24     1   ABORTED"              0 MIN.
                         14:25         CALP EXIT"
                         20:13         CALP ENTRY"
                         20:15     2   TYMNET ENTRY"
                         20:20     2   TYMNET EXIT"          5 MIN.
                         20:22     2   TYMNET ENTRY"
                         20:24     2   TYMNET EXIT"          2 MIN.
                         20:25     2   TYMNET ENTRY"
                         20:26     2   TYMNET EXIT"          1 MIN.
                         20:26     2   TELENET ENTRY"
                         20:32     2   TELENET EXIT"         6 MIN.
                         20:32     2   TELENET ENTRY"
```

```
                      20:34    2   TELENET EXIT"          2 MIN.
                      20:34    2   TYMNET ENTRY"
                      20:36    2   TYMNET EXIT"           2 MIN.
                      20:37        CALP EXIT"
                      22:51        CALP ENTRY"
                      22:52    3   DIALOG ENTRY"
                      22:55    3   DIALOG ABORTED"        3 MIN.
                      22:56    3   DIALOG ENTRY"
                      23:07    3   DIALOG EXIT"          11 MIN.
                      23:07    3   DIALOG ENTRY"
                      23:14    3   DIALOG ABORTED"        7 MIN.
                      23:15        CALP EXIT"
08 MAR 1979           22:06        CALP ENTRY"
                      22:07        LINK TO ORBIT E
                      22:07    B   ORBIT     ENTRY
                      22:12    B   ORBIT     EXIT         5 MIN.
                      22:13        LINK TO DIALOG
                      22:13    A   DIALOG    ENTRY
                      22:33    A   DIALOG    EXIT        20 MIN.
09 MAR 1979           12:47        CALP ENTRY"
                      12:47        LINK TO DIALOG
                      12:47    A   DIALOG    ENTRY
                      13:31    A   DIALOG    EXIT        44 MIN.
                      17:47        CALP ENTRY"
                      17:47        LINK TO DIALOG
                      17:47    A   DIALOG    ENTRY
                      18:39    A   DIALOG    EXIT        52 MIN.
15 MAR 1979           20:16        CALP ENTRY"
                      20:16    4   INTRODUCTION"
                      20:32        CALP ENTRY"
                      20:32    4   INTRODUCTION"
                      20:35    4   END OF INTRO."         3 MIN.
                      20:36    4   DIALOG ENTRY"
                      20:45    4   DIALOG EXIT"           9 MIN.
                      20:45    4   DIALOG ENTRY"
                      20:49    4   DIALOG EXIT"           4 MIN.
                      20:49    4   ABORT EXIT"
                      20:49        LINK TO DIALOG
                      20:49    A   DIALOG    ENTRY
                      23:31        CALP ENTRY"
                      23:31        LINK TO DIALOG
                      23:31    A   DIALOG    ENTRY
                      23:40    A   DIALOG    EXIT         9 MIN.
                      23:41        LINK TO DIALOG
                      23:41    A   DIALOG    ENTRY
                      23:44    A   DIALOG    EXIT         3 MIN.
                      23:45    4   INTRODUCTION"
                      23:48    4   END OF INTRO."         3 MIN.
                      23:48    4   DIALOG ENTRY"
                      23:52    4   DIALOG EXIT"           4 MIN.
                      23:52    4   ABORT EXIT"
                      23:53    5   DIALOG ENTRY"
                      23:59    5   DIALOG EXIT"           6 MIN.
16 MAR 1979            0:00    6   DIALOG ENTRY"
                       0:08    6   DIALOG EXIT"           8 MIN.
                       0:09    6   DIALOG ENTRY"
                       0:19    6   DIALOG EXIT"          10 MIN.
                       0:20    7   DIALOG ENTRY"
                       0:34    7   DIALOG EXIT"          14 MIN.
                       0:35        CALP EXIT"
```

```
                 16 APR 1979      14:10          CALP ENTRY"
                                  14:11    2     TELENET ENTRY"
                                  14:12    2     TELENET EXIT"           1 MIN.
                                  14:12    2     TYMNET ENTRY"
                                  14:13    2     TYMNET EXIT"            1 MIN.
                                  14:14          CALP EXIT"
                                                          LOGGED IN:  1572 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,244274


                 03 MAR 1979      15:43          CALP ENTRY"
                                  15:44    1     ENTRY"
                                  15:46    1     ABORTED"                2 MIN.
                                  15:50    3     DIALOG ENTRY"
                                  16:11    3     DIALOG EXIT"           21 MIN.
                                  16:12          CALP EXIT"
                 05 MAR 1979      19:14          CALP ENTRY"
                                  19:15          LINK TO DIALOG
                                  19:15    A     DIALOG    ENTRY
                                  19:31    A     DIALOG    EXIT         16 MIN.
                 09 MAR 1979      13:40          CALP ENTRY"
                                  13:41    3     DIALOG ENTRY"
                                  13:46    3     DIALOG EXIT"            5 MIN.
                                  13:47    3     DIALOG ENTRY"
                                  13:53    3     DIALOG EXIT"            6 MIN.
                                  13:54    4     INTRODUCTION"
                                  13:59    4     END OF INTRO."          5 MIN.
                                  13:59    4     DIALOG ENTRY"
                                  14:04    4     DIALOG EXIT"            5 MIN.
                                  14:05          LINK TO DIALOG
                                  14:05    A     DIALOG    ENTRY
                                  14:14    A     DIALOG    EXIT          9 MIN.
                                                          LOGGED IN:    80 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,250321


                 02 FEB 1979      15:42          CALP ENTRY"
                                  15:42    1     ENTRY"
                                  15:48    1     EXIT"                   6 MIN.
                                  15:48          CALP EXIT"
                                                          LOGGED IN:     6 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,251000


                 01 FEB 1979      13:24          CALP ENTRY"
                                  13:25          LINK TO DIALOG
                                  13:25    A     DIALOG    ENTRY
                                  13:26    A     DIALOG    EXIT          1 MIN.
                                  13:35          CALP ENTRY"
                                  13:35          LINK TO DIALOG
                                  13:35    A     DIALOG    ENTRY
                                  13:43    A     DIALOG    EXIT          8 MIN.
                                  13:49          CALP ENTRY"
                                  13:50          LINK TO DIALOG
```

```
                      13:50    A    DIALOG     ENTRY
                      13:55    A    DIALOG     EXIT          5 MIN.
                      14:00         CALP ENTRY"
                      14:01         LINK TO DIALOG
                      14:01    A    DIALOG     ENTRY
                      14:13         CALP ENTRY"
                      14:14         CALP EXIT"
                      14:16         CALP ENTRY"
                      14:22         LINK TO DIALOG
                      14:22    A    DIALOG     ENTRY
                      15:30    A    DIALOG     EXIT         68 MIN.
    2 FEB 1979        15:55         CALP ENTRY"
                      15:56         LINK TO DIALOG
                      15:56    A    DIALOG     ENTRY
                      16:07    A    DIALOG     EXIT         11 MIN.
                      16:17         CALP ENTRY"
                      16:17         LINK TO DIALOG
                      16:17    A    DIALOG     ENTRY
                      16:20    A    DIALOG     EXIT          3 MIN.
                      16:29         CALP ENTRY"
                      16:30         LINK TO DIALOG
                      16:30    A    DIALOG     ENTRY
                      16:44         CALP ENTRY"
                      16:44         LINK TO DIALOG
                      16:44    A    DIALOG     ENTRY
    3 FEB 1979        12:12         CALP ENTRY"
                      12:15    A    DIALOG     ENTRY
                      12:20    A    DIALOG     ENTRY
                      12:20    A    DIALOG     EXIT          0 MIN.
                      12:23    A    DIALOG     ENTRY
                      12:37    A    DIALOG     EXIT         14 MIN.
                      12:39    A    DIALOG     ENTRY
                      12:46    A    DIALOG     EXIT          7 MIN.
                      12:48    A    DIALOG     ENTRY
                      13:06    A    DIALOG     EXIT         18 MIN.
                      13:09    A    DIALOG     ENTRY
                      13:22    A    DIALOG     EXIT         13 MIN.
                      13:22    A    DIALOG     ENTRY
                      13:29    A    DIALOG     EXIT          7 MIN.
                      13:30    A    DIALOG     ENTRY
                      13:38    A    DIALOG     EXIT          8 MIN.
                      13:42    A    DIALOG     ENTRY
                      13:43    A    DIALOG     EXIT          1 MIN.
                      13:47    A    DIALOG     ENTRY
                      13:52    A    DIALOG     EXIT          5 MIN.
                      13:53    A    DIALOG     ENTRY
                      13:59    A    DIALOG     EXIT          6 MIN.
                      14:02    A    DIALOG     ENTRY
                      14:03    A    DIALOG     EXIT          1 MIN.
                      14:04    A    DIALOG     ENTRY
                      14:33    A    DIALOG     ENTRY
                      14:39    A    DIALOG     EXIT          6 MIN.
                      14:47         CALP ENTRY"
                      14:47         LINK TO DIALOG
                      14:47    A    DIALOG     ENTRY
                      14:57    A    DIALOG     EXIT         10 MIN.
                      14:59    A    DIALOG     ENTRY
                      15:02    A    DIALOG     EXIT          3 MIN.
                      16:16    A    DIALOG     ENTRY
                      16:21    A    DIALOG     ENTRY
```

```
                                16:23   A   DIALOG    EXIT        2 MIN.
                                16:24   A   DIALOG    ENTRY
                                16:25   A   DIALOG    EXIT        1 MIN.
                                16:25   A   DIALOG    ENTRY
                                16:26   A   DIALOG    EXIT        1 MIN.
                                                  LOGGED IN:   354 MIN. TOT

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
134057,261141


           28 APR 1979          10:33       CALP ENTRY"
                                10:33   1   ENTRY"
                                10:45   1   ABORTED"                12 MIN.
                                10:48   2   TELENET ENTRY"
                                10:51   2   TELENET EXIT"            3 MIN.
                                10:51   2   TYMNET ENTRY"
                                10:53   2   TYMNET EXIT"             2 MIN.
                                10:55   3   DIALOG ENTRY"
                                11:02   3   DIALOG EXIT"             7 MIN.
                                11:02   3   DIALOG ENTRY"
                                11:08   3   DIALOG EXIT"             6 MIN.
                                11:12       LINK TO DIALOG
                                11:12   A   DIALOG    ENTRY
                                11:47   A   DIALOG    EXIT          35 MIN.
                                15:35       CALP ENTRY"
                                15:35   1   ENTRY"
                                15:40   1   ABORTED"                 5 MIN.
                                15:41   2   TYMNET ENTRY"
                                15:42   2   TYMNET EXIT"             1 MIN.
                                15:43   2   TELENET ENTRY"
                                15:44   2   TELENET EXIT"            1 MIN.
                                15:44   3   DIALOG ENTRY"
                                15:51   3   DIALOG EXIT"             7 MIN.
                                15:51       LINK TO DIALOG
                                15:51   A   DIALOG    ENTRY
                                16:04   A   DIALOG    EXIT          13 MIN.
                                16:36   A   DIALOG    ENTRY
                                16:58   A   DIALOG    EXIT          22 MIN.
                                17:00   5   DIALOG ENTRY"
                                17:08   5   DIALOG EXIT"             8 MIN.
                                17:09   6   INTRODUCTION"
                                17:10   6   END OF INTRO."           1 MIN.
                                17:11   6   DIALOG ENTRY"
                                17:17   6   DIALOG EXIT"             6 MIN.
                                17:18   7   DIALOG ENTRY"
                                17:27   7   DIALOG EXIT"             9 MIN.
                                17:28       CALP EXIT"
           30 APR 1979          20:14       CALP ENTRY"
                                20:29   A   DIALOG    ENTRY
                                20:37       LINK TO DIALOG
                                20:37   A   DIALOG    ENTRY
                                20:44   A   DIALOG    EXIT           7 MIN.
                                21:04   A   DIALOG    ENTRY
                                21:59   A   DIALOG    EXIT          55 MIN.
           03 MAY 1979          18:12       CALP ENTRY"
                                18:13   5   DIALOG ENTRY"
                                18:19   5   DIALOG EXIT"             6 MIN.
                                18:20   6   INTRODUCTION"
                                18:21   6   END OF INTRO."           1 MIN.
```

```
                        18:22   6   DIALOG ENTRY"
                        18:29   6   DIALOG EXIT"          7 MIN.
                        18:30   7   DIALOG ENTRY"
                        18:44   7   DIALOG EXIT"         14 MIN.
                        18:45       LINK TO DIALOG
                        18:45   A   DIALOG    ENTRY
      04 MAY 1979       15:34       CALP ENTRY"
                        15:34       LINK TO DIALOG
                        15:34   A   DIALOG    ENTRY
                        16:50   A   DIALOG    EXIT       76 MIN.
                        18:24       CALP ENTRY"
                        18:24       LINK TO DIALOG
                        18:24   A   DIALOG    ENTRY
                        19:06   A   DIALOG    EXIT       42 MIN.
                        19:08   3   ORBIT ENTRY"
                        19:12   3   ORBIT EXIT"           4 MIN.
                        19:13   4   INTRODUCTION"
                        19:15   4   END OF INTRO."        2 MIN.
                        19:16   4   ORBIT ENTRY"
                        19:20   4   ORBIT EXIT"           4 MIN.
                        19:21   5   ORBIT ENTRY"
                        19:28   5   ORBIT EXIT"           7 MIN.
                        19:29       CALP EXIT"
      06 MAY 1979       14:04       CALP ENTRY"
                        14:04       LINK TO ORBIT E
                        14:04   B   ORBIT     ENTRY
                        14:15   B   ORBIT     EXIT       11 MIN.
                        14:16   A   DIALOG    ENTRY
                        14:31   A   DIALOG    EXIT       15 MIN.
                                          LOGGED IN:   493 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,264300


      23 FEB 1979       17:02       CALP ENTRY"
                        17:02   1   ENTRY"
                        17:04   1   ABORTED"              2 MIN.
                        17:04       CALP EXIT"
                        17:09       CALP ENTRY"
                        17:10   2   TYMNET ENTRY"
                        17:11   2   TYMNET EXIT"          1 MIN.
                        17:12   2   TELENET ENTRY"
                        17:14   2   TELENET EXIT"         2 MIN.
                        17:15   2   TELENET ENTRY"
                        17:16   2   TELENET EXIT"         1 MIN.
                        17:18   3   DIALOG ENTRY"
                        17:30   3   DIALOG EXIT"         12 MIN.
                        17:31   3   DIALOG ENTRY"
                        17:38       CALP ENTRY"
                        17:39   2   TYMNET ENTRY"
                        17:40   2   TYMNET EXIT"          1 MIN.
                        17:40   2   TELENET ENTRY"
                        17:41   2   TELENET EXIT"         1 MIN.
                        17:42   3   DIALOG ENTRY"
                        17:48   3   DIALOG EXIT"          6 MIN.
                        17:49   3   DIALOG ENTRY"
                        17:56   3   DIALOG EXIT"          7 MIN.
                        17:56       CALP EXIT"
                        18:00       CALP ENTRY"
```

```
                            18:00   4  INTRODUCTION"
                            18:06   4  END OF INTRO."       6 MIN.
                            18:06   4  DIALOG ENTRY"
                            18:16   4  DIALOG EXIT"        10 MIN.
                            18:16      CALP EXIT"
                            18:19      CALP ENTRY"
                            18:19   4  INTRODUCTION"
                            18:23   4  END OF INTRO."       4 MIN.
                            18:24      CALP EXIT"
                            18:29      CALP ENTRY"
                            18:30      CALP EXIT"
            24 FEB 1979     14:48      CALP ENTRY"
                            14:49   3  DIALOG ENTRY"
                            14:55   3  DIALOG ABORTED"      6 MIN.
                            14:55      CALP EXIT"
                            14:57      CALP ENTRY"
                            14:57   4  INTRODUCTION"
                            15:01   4  END OF INTRO."       4 MIN.
                            15:04      CALP ENTRY"
                            15:04   4  INTRODUCTION"
                            15:07   4  END OF INTRO."       3 MIN.
                            15:07   4  DIALOG ENTRY"
                            15:13   4  DIALOG EXIT"         6 MIN.
                            15:14   5  DIALOG ENTRY"
                            15:25   5  DIALOG EXIT"        11 MIN.
                            15:25   5  DIALOG ENTRY"
                            15:26   5  ABORT EXIT"          1 MIN.
                            15:27   6  INTRODUCTION"
                            15:28   6  END OF INTRO."       1 MIN.
                            15:28   6  DIALOG ENTRY"
                            15:36   6  DIALOG EXIT"         8 MIN.
                            15:37   7  DIALOG ENTRY"
                            15:51   7  ABORT EXIT"         14 MIN.
                            15:52      CALP EXIT"
                            15:55      CALP ENTRY"
                            15:56      CALP EXIT"
            03 MAR 1979     13:07      CALP ENTRY"
                            13:07      CALP EXIT"
                            15:28      CALP ENTRY"
                            15:29   7  DIALOG ENTRY"
                            15:42   7  DIALOG EXIT"        13 MIN.
                            15:42      CALP EXIT"
                            15:49      CALP ENTRY"
                            15:49      LINK TO DIALOG
                            15:49   A  DIALOG    ENTRY
                            16:16   A  DIALOG    EXIT      27 MIN.
                            16:20      CALP ENTRY"
                            16:20      LINK TO DIALOG
                            16:20   A  DIALOG    ENTRY
                            16:27   A  DIALOG    EXIT       7 MIN.
                                                  LOGGED IN:   172 MIN, TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,304304


            24 FEB 1979     13:28      CALP ENTRY"
                            13:35      CALP EXIT"
            28 FEB 1979     16:12      CALP ENTRY"
                            16:15   3  ORBIT ENTRY"
```

```
                     16:27   3   ORBIT ABORTED"        12 MIN.
     01 MAR 1979     20:19       CALP ENTRY"
                     20:20   3   ORBIT ENTRY"
                     20:31   3   ORBIT EXIT"           11 MIN.
                     20:33       CALP EXIT"
     22 MAY 1979     20:09       CALP ENTRY"
                     20:12   3   DIALOG ENTRY"
                     20:26   3   DIALOG ABORTED"       14 MIN.
                     20:27   3   DIALOG ENTRY"
     23 MAY 1979     12:26       CALP ENTRY"
                     12:29   3   DIALOG ENTRY"
                     12:55   3   DIALOG EXIT"          26 MIN.
                     13:01       CALP EXIT"
     24 MAY 1979      9:55       CALP ENTRY"
                      9:56       LINK TO DIALOG
                      9:56   A   DIALOG    ENTRY
                     10:09   A   DIALOG    EXIT        13 MIN.
     25 MAY 1979     10:19       CALP ENTRY"
                     10:22       LINK TO DIALOG
                     10:22   A   DIALOG    ENTRY
     28 MAY 1979     14:45       LINK TO DIALOG
                     14:45   A   DIALOG    ENTRY
                     15:19   A   DIALOG    EXIT        34 MIN.
                                         LOGGED IN:   403 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,314306


     09 MAR 1979     15:14       CALP ENTRY"
                     15:19       CALP EXIT"
                                         LOGGED IN:     5 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,324310


     08 MAR 1979     14:25       CALP ENTRY"
                     14:26   3   DIALOG ENTRY"
                     14:30   3   DIALOG ABORTED"        4 MIN.
                     14:30   3   DIALOG ENTRY"
                     14:32   3   DIALOG ABORTED"        2 MIN.
                     14:33   3   DIALOG ENTRY"
                     14:50   3   DIALOG EXIT"          17 MIN.
                     14:51   3   DIALOG ENTRY"
                     15:01   3   DIALOG EXIT"          10 MIN.
                     15:02   3   DIALOG ENTRY"
                     15:08   3   DIALOG EXIT"           6 MIN.
                     15:09       CALP EXIT"
     12 MAR 1979     10:06       CALP ENTRY"
                     10:07       LINK TO DIALOG
                     10:07   A   DIALOG    ENTRY
                     10:45   A   DIALOG    EXIT        38 MIN.
                     10:48   4   INTRODUCTION"
                     10:57   4   END OF INTRO."         9 MIN.
                     10:57       CALP EXIT"
                     16:23       CALP ENTRY"
                     16:23   4   INTRODUCTION"
                     16:28   4   END OF INTRO."         5 MIN.
                     16:28   4   ORBIT ENTRY"
```

```
                              16:34    4  ORBIT EXIT"           6 MIN.
                              16:34    4  DIALOG ENTRY"
                              16:42    4  DIALOG EXIT"          8 MIN.
                              16:42       CALP EXIT"
              19 MAR 1979     12:53       CALP ENTRY"
                              12:54       LINK TO DIALOG
                              12:54    A  DIALOG     ENTRY
                              13:30    A  DIALOG     EXIT      36 MIN.
                              13:32    4  INTRODUCTION"
                              13:36    4  END OF INTRO,"        4 MIN.
                              13:37    4  DIALOG ENTRY"
                              13:44    4  DIALOG EXIT"          7 MIN.
                              13:45    4  ABORT EXIT"
                              13:46       LINK TO DIALOG
                              13:46    A  DIALOG     ENTRY
                              13:58    A  DIALOG     EXIT      12 MIN.
              14 APR 1979     12:17       CALP ENTRY"
                              12:17       LINK TO DIALOG
                              12:17    A  DIALOG     ENTRY
                              12:50       CALP ENTRY"
                              12:52       LINK TO DIALOG
                              12:52    A  DIALOG     ENTRY
                              14:11    A  DIALOG     EXIT      79 MIN.
              21 APR 1979     13:22       CALP ENTRY"
                              13:26    5  DIALOG ENTRY"
                              13:32    5  ABORT EXIT"           6 MIN.
                              13:32       CALP EXIT"
                              13:34       CALP ENTRY"
                              13:35    5  DIALOG ENTRY"
                              13:42    5  DIALOG EXIT"          7 MIN.
                              13:43    5  ORBIT ENTRY"
                              13:55    5  ORBIT EXIT"          12 MIN.
                              13:56       LINK TO DIALOG
                              13:56    A  DIALOG     ENTRY
                              15:34    A  DIALOG     EXIT      98 MIN.
              25 APR 1979     19:31       CALP ENTRY"
                              19:31       LINK TO DIALOG
                              19:31    A  DIALOG     ENTRY
                              20:11    A  DIALOG     EXIT      40 MIN.
              01 MAY 1979     19:32       CALP ENTRY"
                              19:33    6  INTRODUCTION"
                              19:34    6  END OF INTRO,"        1 MIN.
                              19:34    6  DIALOG ENTRY"
                              19:44    6  DIALOG EXIT"         10 MIN.
                              19:46       LINK TO DIALOG
                              19:46    A  DIALOG     ENTRY
                              20:36    A  DIALOG     EXIT      50 MIN.
              06 MAY 1979     10:18       CALP ENTRY"
                              10:19       LINK TO DIALOG
                              10:19    A  DIALOG     ENTRY
                              10:56    A  DIALOG     EXIT      37 MIN.
                                                      LOGGED IN:  532 MIN,  TOT

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
134057,334312

              12 MAR 1979     16:09       CALP ENTRY"
                              16:10    3  DIALOG ENTRY"
                              16:20    3  DIALOG ABORTED"      10 MIN.
                              16:20   3   DIALOG ENTRY"
                              16:26   3   DIALOG EXIT"          6 MIN.
                              16:27       CALP EXIT"
                                                     LOGGED IN:    18 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,340720


            07 MAR 1979       19:36       CALP ENTRY"
                              19:37   1   ENTRY"
                              19:45   1   ABORTED"              8 MIN.
                              19:46   2   TYMNET ENTRY"
                              19:49   2   TYMNET EXIT"          3 MIN.
                              19:50   2   TYMNET ENTRY"
                              19:51   2   TYMNET EXIT"          1 MIN.
                              19:51   2   TYMNET ENTRY"
                              19:54   2   TYMNET EXIT"          3 MIN.
                              19:54   2   TYMNET ENTRY"
                              19:55   2   TYMNET EXIT"          1 MIN.
                              19:57   3   DIALOG ENTRY"
                              20:02   3   DIALOG ABORTED"       5 MIN.
                              20:03   3   DIALOG ENTRY"
                              20:12   3   DIALOG ABORTED"       9 MIN.
                              20:13       CALP EXIT"
            08 MAR 1979       10:07       CALP ENTRY"
                              10:08       LINK TO DIALOG
                              10:08   A   DIALOG    ENTRY
                              10:56   A   DIALOG    EXIT       48 MIN.
                              15:37       CALP ENTRY"
                              15:37       LINK TO DIALOG
                              15:37   A   DIALOG    ENTRY
                              15:44   A   DIALOG    EXIT        7 MIN.
            14 MAR 1979       18:29       CALP ENTRY"
                              18:30   4   INTRODUCTION"
                              18:34   4   END OF INTRO."        4 MIN.
                              18:34   4   DIALOG ENTRY"
                              18:43   4   DIALOG EXIT"          9 MIN.
                              18:44   4   ABORT EXIT"
                              18:44       LINK TO DIALOG
                              18:44   A   DIALOG    ENTRY
                              19:12   A   DIALOG    EXIT       28 MIN.
                              19:16       CALP ENTRY"
                              19:17   5   DIALOG ENTRY"
                              19:23   5   DIALOG EXIT"          6 MIN.
                              19:23   5   DIALOG ENTRY"
                              19:25   5   ABORT EXIT"           2 MIN.
                              19:25       CALP EXIT"
                                                     LOGGED IN:   145 MIN. TOT

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134057,350722


            13 APR 1979       10:18       CALP ENTRY"
                              10:21   1   ENTRY"
                              10:22   1   ABORTED"              1 MIN.
                              10:24   2   TYMNET ENTRY"
                              10:27   2   TYMNET EXIT"          3 MIN.
                              10:28   3   DIALOG ENTRY"
                              10:39   3   DIALOG EXIT"         11 MIN.
                              10:40   3   DIALOG ENTRY"
                              10:43   3   DIALOG ABORTED"       3 MIN.
                              10:44   4   INTRODUCTION"
                              10:51   4   END OF INTRO."        7 MIN.
                              10:54   6   INTRODUCTION"
                              10:55   6   END OF INTRO."        1 MIN.
                              10:55   6   ORBIT ENTRY"
                              11:02   6   ORBIT EXIT"           7 MIN.
                              11:02   6   DIALOG ENTRY"
                              11:11   6   ABORT EXIT"           9 MIN.
                              11:12   7   ORBIT ENTRY"
                              11:21   7   ORBIT EXIT"           9 MIN.
                              11:22       LINK TO DIALOG
                              11:22   A   DIALOG    ENTRY
                              11:28   A   DIALOG    EXIT        6 MIN.
                                                    LOGGED IN:    70 MIN, T

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
134106,123141


             15 MAY 1979      14:30       CALP ENTRY"
                              14:34       LINK TO DIALOG
                              14:34   A   DIALOG    ENTRY
                              14:39   A   DIALOG    EXIT        5 MIN.
                              21:46       CALP ENTRY"
                              21:47       LINK TO DIALOG
                              21:47   A   DIALOG    ENTRY
                              22:07       LINK TO ORBIT E
                              22:10       LINK TO ORBIT E
                              22:11   A   DIALOG    ENTRY
                              22:19   A   DIALOG    EXIT        8 MIN.
                                                    LOGGED IN:    42 MIN, T

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX


END      USER: **CARUSO [134057,120121]      JOB: INDRPT  SEQ: 10055   FINI
****************************************************************************
```

Appendix 2

Assessment of the TRAINER Tutorials

by

H. and R. N. Nicholas

Educational Design

Trainer looks and operates much as any well-constructed CAI program is expected to--and therein may lie its contribution to the use of CAI programs. TRAINER provides no great innovations in either programming or content but the attitude which controlled TRAINER's development has seldom been so intensely applied in CAI circles.

The design considerations demanded:

1. The interaction was to be as informative as possible within a rigid constraint that every display should be a "distilled essence" rather than a verbose monologue.
2. "Practice" in the form of user responses was to occur with a high frequency.
3. The written text, itself as distilled as possible, should provide whatever heavy reading and any extensive examples/illustrations which would be needed.
4. User errors were to be handed "non-punitively", though the unprepared user would be guided to remediation either within the program or in the written text.
5. The user would be able to enter any module at any time, in any sequence, and as many times as may be desired.
6. The user could go back-and-forth from TRAINER to the Emulators more-or-less at will during the period of shaping skills.
7. Performance measures should be as unobtrusive and non-invasive as possible.
8. All errors and problems at run time, short of system failure, should be recoverable and have no (or minimal) impact on the user.

Generally, the design considerations required an attention to detail which is unusual in CAI. Every point at which a user response was required was thoroughly tested to ensure that responses would result in reliable feedback and that no unscheduled "drop-thrus" would occur as a result of an unexpected response. The so-called "bullet-proofing" effort is the most extensive and thorough in our experience.

Perhaps the one factor which distinguishes TRAINER is that it is sound--not on just one dimension but many:

TRAINER is pedagogically sound. It proceeds with a definite goal in view to encourage learning with a maximum of information provided with a minimum of "window dressing." The user does not have to make ill-informed guesses about "what is important."

TRAINER is informationally sound. It provides a maximum of information with a minimum of extraneous cues.

TRAINER is behaviorally sound. It provides for "active responding" in an environment which both rewards correct responses and flags incorrect responses--though the flagging is always non-punitive. A built-in feature of this design is the reduction of anxiety which typically occurs in learning new tasks.

Finally, TRAINER is sound from the point of view of coding. Every effort was made to reduce or eliminate repetitive/redundant code. Special "tricks" were avoided whereever possible retaining only those necessitated either by the realities of CATALYST or of the hardware. In addition, operations which are difficult for or not part of CATALYST were coded in PIL and activated through the CATALYST/PIL interface, providing considerable additional power in building an effective program.

If TRAINER is of a "type", it is more a "skill-shaper" than a "cognitive-developer"; that is, it is geared more to teaching the profound truths about why a given structure is so or why and how a structure or process is formed. This is not to say that TRAINER provides no cognitive component; indeed, the presence of the two major search systems as subject matter necessitates some teaching of similarities and differences and of knowing when to choose which search system.

One innovation which TRAINER provides is the ability for the user to determine, to a large extent, the strategy to be employed in learning about the search systems covered. For example, the user may decide to learn all about DIALOG and then go back and learn about ORBIT. On the other hand, the user may decide to learn how query formulation, exploring the similarities and differences of the two systems. In fact, the user may even move back-and-forth between these strategies at different stages of learning. In this manner, TRAINER truly provides a tailored learning opportunity.

To facilitate tailored learning, TRAINER is divided into modules which represent the major informational divisions of the learning task. Each module is then divided into a) General information/principles about this module and b) practice and specific information/principles for each search system covered. For example, in one module, the user receives a brief introduction to logical operators and their use in modifying a search strategy. Then the user is permitted to explore how each search system uses the logical operators (NOT may be used in one system as a unary operator while in another system is treated as a binary operator with the dual implication of AND and NOT). In fact, in most of the modules the general information/principles is optional with the user just as is the selection of which search systems to study, when, in what order, and how many. The only point where the user is required to follow a "lockstep" or linear sequence is within the subtasks dealing with individual points/principles;

153

however, even then, the user always has the option of terminating the subtask and returning to a higher level of the task to select the same or another subtask or move to some other task.

Finally, the user is able to evaluate how well the principle or skill has been mastered by linking to a search system Emulator which provides a high "real-world" correlation. As necessary, the user may "ping pong" between the Learning Modules and the Emulator until the Emulator has been negotiated successfully. Once the user is confident that the Emulator has been mastered, arrangements may be made to try some searches on the "real" search systems--the "final exam", if you please.

Having been involved from the beginning of the project in both initial design and in the iterative evaluation procedure employed throughout, we are satisfied that the best principles of CAI design, task analysis, information transfer, and applied behavior analysis have been implemented. The principles of design of Personalized Systems of Instruction (the Keller Plan) (1) have been followed and have largely been responsible for ensuring our early and continued observance of the principles of good training/education. In fact, the only point where we deviated from the Keller model is that we provide no "artificial" motivators (grades, etc.) since our target population is largely self-selected either by occupation or a program of study into which TRAINER is incorporated. It is significant to the authors that the question asked of TRAINER is virtually always "Can I become a good searcher" and not "How much do I have to do to get an A", or "B", or "C"....

---

[1] Keller, Fred S., and Sherman, J. Gilmour, THE KELLER PLAN HANDBOOK (1974, Menlo Park, Ca.: W.A. Benjamin), other texts are also available through the Center for Personalized Instruction, Georgetown Univ., Washington, D.C.

[The point of the final comment by Nicholas and Nicholas is apparently this: users of TRAINER have "real" need to learn that which TRAINER proposes to "teach" them; they do not associate the TRAINER programs with any formal curriculum where a grade will be assigned for arbitrarily measured achievement. Since TRAINER has not been a part of any degree program, this kind of motivation, i.e., a belief in the personal benefits gained in acquiring the search skill, is the most likely stimulus for its use. E.C.]

Appendix 3

CATALYST PRIMER
FOR THE
TRAINER CONVERSION
PROGRAMMER

This appendix is an extensive revision and augmentation of a non-copyrighted paper titled "CATALYST USERS GUIDE" distributed as "DEC-10 Pitt Software-5, April 1975" by the University of Pittsburgh Computer Center.

Inaccuracies in the "CATALYST USERS GUIDE" and many explanations have been expanded in order that the non-DEC-10 programmer may gain a better insight to how CATALYST behaves on the Pitt DECsystem-10 computers.

THE COMPUTER CENTER
UNIVERSITY OF PITTSBURGH
600 EPSILON DRIVE
PITTSBURGH, PENNSYLVANIA 15238

CATALYST Reference Card
May, 1975

The information on this card presupposes some knowledge of CATALYST. It has been designed to be used as a quick reference to the material contained in the CATALYST users guide. If use of the direct PIL statement is anticipated, please obtain a PIL manual.

CONVENTIONS

The following conventions are used throughout this card.

dev:	the device on which the file exists.
lesson	any file name up to six characters.
.sec	any file extension up to three characters.
p,pn	the project, programmer number of the file owner.
nn	is a positive integer less than 131072 (0 < nn < 131072).
verb	is any valid CATALYST command such as TYPE, FRAME, etc.
arg	is any valid argument for the verb it is associated with.

Commands start in column one and the first character of any command line must be one of the following:

*	Once executed are maintained throughout the lesson. Some of the commands may be used repeatedly and may be changed, but they must be executed before they are utilized in the lesson.
?	Refers to answers supplied by the student. These commands demand a response, examine the reply or branch unconditionally.
.	Direct PIL statement.
;	Comment lines.
NCR.	Outputs the text following on the same line without a carriage return, and prompts with a carat (>).

RUNNING A CATALYST LESSON

```
.R CTLYST
```

The terminal will respond with

```
CATALYST/II
1 JULY 1974 01 01 01.1
Lesson.Section [P,Pn]:
```

At this point, the file specification string designating the lesson should be entered. The general form is as follows:

```
dev:lesson.sec=dev:lesson.sec[p,pn]/switch(es)
```

The file specification to the left of the equal sign is the output file and to the right is the input file. The allowable switches are:

/S	causes the input file to be encoded and written on the output file specified.
/U	is used to decode a coded lesson.
/V	forces the syntax of a CATALYST lesson to be verified for correctness. Only the input file specification should be entered followed by the /V as follows: .

```
dev:lesson.sec[p,pn]/V
```

ASTERISK COMMANDS

***END**

Signifies the end of a lesson. This is usually the last line of a CATALYST lesson.

***FRAME** nn

Identifier which references the text found directly after it. This includes direct PIL statements and question mark commands up to the next identifier.

***HELP**=nn,keyword

CATALYST will automatically examine every answer from the student. If that answer matches the keyword, CATALYST will branch to the frame specified by nn. Each time a *HELP is executed, the new frame number nn and keyword replaces the previous one. To turn the *HELP feature off once it has been utilized enter: *HELP=0

***NAME**

Remembers the user's name by executing the PIL command "NAME = MY NAME" and uses it in 50% of the positive reinforcements.

***PIL**=keyword

Used to define a keyword, which when typed by the student in CATALYST, will cause a transfer to PIL.

***RESET** nn, ... ,nn

Zeros the counts on frames with a COUNT verb. If nn does not exist, no action is taken. The user may reset all the counts in a lesson by using the form: *RESET ALL.

***RPIL**=keyword

Defines a keyword which when typed by the student in PIL, will transfer him back to where he left CATALYST.

***TRACE**

This causes a list of frame numbers encountered during a given session to be printed. This information may also be appended to a file. The form is:
*TRACE TO dev:lesson.sec[p,pn];

***TTY**=keyword or NO keyword

Performs the same function as the "SET TTY keyword" or "SET TTY NO keyword" as executed in the monitor. The valid keywords are: ALTMODE, BLANKS, CRLF, ECHO, FILL, FORM, GAG, LC, PAGE, TAB, TAPE, WIDTH. For more information on these keywords see the DECsystem-10 OPERATING SYSTEM COMMANDS MANUAL.

QUESTION MARK COMMANDS

?	The last response is examined or a branch.
??	Signifies a demand for a user response. CATALYST will prompt with a carat (>) on the terminal, and will wait for a response.
+	The plus sign, when used with a question mark, gives positive reinforcement for the correct response. The reinforcement is in the form of a random congratulatory message.
-	The minus sign queries the user about any unexpected responses he may have typed.

The form of question mark command is:

```
?+-verb  arg;verb  arg;verb  arg:anticipated responses
```

where verb is any of: COUNT, ELAPSE, EXP, FRAME, LATENCY, LINK, RETURN, STR, TIME, TYPE, UNLINK;

where arg is any of the valid arguments allowed for the particular verb;

where "+-" can be left out or used separately.

The verb and arg must be separated by a space. They must be separated from other pairs with semicolons(;) and the last pair must end with a colon(:) followed by any test string(s).

APPEND

This verb is used to append the information listed after the semicolon(;) onto the end of the file specified. The form of the APPEND verb is:

```
?APPEND dev: lesson.sec[p,pn];IN FORM mm, a,b,c
```

The data a,b,c must be either PIL variables, constants, and/or alphanumeric strings enclosed in quotation marks. The first item in the list may optionally be the string "IN FORM mm", where mm is some predefined or literal PIL form.

COUNT

This verb allows conditional branching depending on the number of times a user may execute a frame.

ELAPSE

Transfers to a frame once the time in a timed response is exhausted.

EXP

This verb requires that an arithmetic expression be entered by the user. The value of the result is stored for later use.

FRAME H

Returns to the last frame where the keyword specified by *HELP was typed by the user as a response.

FRAME T

Returns to the last frame where the time in a timed response elapsed.

FRAME X

Causes a branch to the frame specified in the last encountered RETURN statement.

LATENCY

A verb which allows time studies to be performed on a student's learning progress.

LINK

Can be used to call CATALYST subroutines. If a lesson is called using LINK all non-PIL information concerning the current lesson is saved. Next CATALYST begins execution of the lesson specified with the LINK verb. The form is:

```
?LINK dev:lesson.sec[p,pn];
```

RETURN nn

Specifies which frame to branch to when the next "FRAME X" is encountered.

STR

Saves a user's response for later use.

TIME

This verb is used to set a time limit in seconds, as to how long CATALYST will wait for a response from the user. The maximum time allowed is 3600 seconds (1 hour).

TYPE

Allows different forms of anticipated responses.

TYPE 1

Looks for a response that agrees exactly with one of the expected responses (test strings).

TYPE 2

Looks for only one keyword in the user's total response to match a test string. Keyword must be a part of the test string.

TYPE 3

Looks for several keywords, all of which must be present in the user's response.

TYPE 4

Same as "TYPE 3" except the order of the keywords must be the same as the expected responses (test strings).

TYPE 5

Looks for an equivalent numeric algebraic form.

TYPE 6

Looks for the first character of the user's response to match one of the test strings (expected responses).

TYPE 7

Same as "TYPE 1" but allows embedded blanks in the user's response.

UNLINK

Returns control to the statement in the calling lesson following the LINK.

RESPONSE

"RESPONSE=keyword" or "RESPONSE=PIL if clause" looks for a specific keyword in the user's response.

Statement Types

CATALYST is a Lesson-Designer Language tailored for the DECsystem-10 which provides a quick coding scheme for most CAI activities which require a rather basic structure. In addition, because CATALYST does not stand alone as a separate processor, using the PIL/X language processor as a "host," the full capability of PIL/X, a JOSS-TELECOMP-MUMPS-type language, is made available to the CATALYST lesson designer (the LD). It is largely through the CATALYST-PIL interface that the flexibility and power of CATALYST use is manifest.

CATALYST syntax is straightforward and line-oriented; that is, column one of each line of a CATALYST lesson is examined for a key character which indicates its use. There are six line statement types as follows:

Column 1 Character	Indicates
;	comment--this line is ignored during processing
*	lesson parameter
?	test-and-branch on condition
.	line is passed to PIL/X for processing
N	(if followed by "CR." in columns 2 thru 4) line of text beginning in column 5 typed on terminal with carriage return-line feed sequence suppressed ("No CR") at the end of the line
Any other character	line of text beginning in column 1 typed on terminal and terminated by carriage return-line feed

To help users who wish to translate the TRAINER CALP modules into other languages, the following discussion will highlight each of the six line statement types and the relevant variants of each.

Text Statements

Lines which do NOT have the special statement characters in column 1 are considered text which is printed on the student's terminal and terminated by a Carriage Return and Line Feed.

TAB (control-1) characters will be transmitted according to the use of the *TTY statement described below. Other control characters will be transmitted to the terminal as text characters. BACKSPACE (control-H) characters will function properly if the student's terminal has the backspace ability. BELL (control-G) should also operate properly.

Lower case characters will be transmitted by the CPU as lower case (octal codes 141 to 172) and will be displayed on the student's terminal as lower case if it has lower case capability; otherwise, the terminal will convert them to upper case.

Special effects desired, such as displaying the current value of PIL variables, must be handled using PIL direct mode statements such as ".TYPE IN FORM".

Example:

```
.TYPE in FORM "THE TIME IS:##########", BCD TIME
```

causes (if BCD TIME is 3 minutes, 34.3 seconds past noon):

```
THE TIME IS: 12 03 34.3
```

to appear on the student's terminal. Period statements are discussed below. Refer to the CATRAN description for details on CATRAN created FORTRAN versions with respect to PIL variables.

Program Statements

All CATALYST statements start in column one and the first character of any statement line will be one of the following:

* (Asterisk Statements)

Once executed these Asterisk Statements are maintained throughout the lesson. Some of the statements may be used repeatedly and may be changed, but must be executed before they are utilized in the lesson. There are nine Asterisk statements; END, FRAME, HELP, NAME, PIL, RESET, RPIL, TRACE, TTY.

? (Question Mark Statements)

The Question Mark Statements refer to answers supplied by a student. These statements demand a response, examine the reply or branch.

One question mark in column one indicates an unconditional branch or examines the last response. Two question marks signify a demand for a student response. CATALYST will prompt with a carat (>) on the terminal, will wait for a response, and then will examine the reply.

. (Period Statements)

The Period Statements are PIL statements in the "desk calculator mode" and are referred to as Direct Mode Statements. For more information on the PIL language, see the PIL Manual, available through the University of Pittsburgh Bookstore. (See CATRAN section of this report for handling of PIL statements in FORTRAN code for CATALYST program segments.)

; (Semicolon)

All text that has a semicolon in column one will be considered as a comment line. These lines may be used to document the lesson internals since these lines will not be printed to the student.

NCR. (No Carriage Return)

This string beginning in column one and preceding any text on a line will output that line to the student without a carriage return at the end. The next line of text or the prompt character from a "?" statement will be typed on the same line.

Asterisk Statements

*END

This verb is used to signify the end of a lesson.

A lesson may have more than one "*END" statement, any one of which, when encountered, terminates that lesson.

The last physical line of a lesson is followed by an implied "*END".

*FRAME

The verb *FRAME serves as an identifier which references any statements and text found directly below it up to the next *FRAME statement.

EXAMPLE:

```
*FRAME 1974
HOW ARE YOU?
;START BY ASKING THE STUDENT A QUESTION.
??FRAME 100; TYPE 7: O.K., OK, GOOD, NOT BAD
.SET X = X + 1
*FRAME 31071
```

In this example, all the lines between "*FRAME 1974" and "FRAME 131071" belong to frame 1974. Anytime the LD references frame 1974, those lines will be executed. The argument for the verb FRAME can be any number between 1 and 131071 (0 < argument < 131072). Frame numbers need not be used sequentially, but any given frame number must be unique within a particular lesson file.

*HELP

In the past, whenever the lesson designer wished to give the student the option of requesting help, he was forced to place a specific test statement after each input request. This statement had to test the answer input for a particular phrase indicating a need for help. If the lesson designer accidently omitted this test, the student could well become frustrated attempting to figure out the answer to a question. It is for this reason that the statement

*HRLP=nn, string

was developed. After a *HELP statement has been executed, CATALYST automatically examines every answer input from the student. If the answer matches the string exactly (the expected help response), an automatic branch is taken to the frame specified by "nn". Here, the lesson designer may offer what help he thinks is necessary to aid the student in answering the question. Each time a *HELP statement is executed, the new frame number and string replaces the old values. To turn off the *HELP features once it has been utilized, merely enter:

*HELP = 0

*NAME

This verb is used to create a PIL variable called "NAME". The contents of the variable will be used in conjunction with the positive reinforcement operation. If the LD uses the verb *NAME the following will appear on the student's terminal:

PLEASE ENTER YOUR FIRST NAME OR NICKNAME.>

The string entered by the student becomes the value of NAME for the lesson.

*PIL

This is used to define a keyword which when entered by the student as a response occuring in a CATALYST lesson, will immediately transfer control to the PIL processor. Thus the student can use the PIL language for calculations without affecting any stored data used by the LD. The keyword can be any alphabetic string up to eight characters.

EXAMPLE:

*PIL = CALC

If the student types the keyword "CALC" anytime after a prompt in CATALYST he will automatically be transferred to PIL. To return to CATALYST from PIL the LD must have set the keyword for RPIL prior to the transfer.

*RESET

This verb is used to clear the values on frames that have used the COUNT verb (see the explanation on the COUNT verb elsewhere in this document).

EXAMPLE:

*RESET 100,131071,1,5

The frames 100,131071,1,5, if they have COUNT verbs associated with them, will be reset. After executing the statement all the COUNT's in the frames 100,131071,1,5 are set back to their original values and are ready to be used again. If the frame number does not exist, no action is taken. If the LD wishes to reset all of the COUNT verbs in the entire lesson, he should use the statement:

*RESET ALL

NOTE: the COUNT's are reset to their initial values specified by the COUNT verbs in the affected FRAME and NOT to some default value.

*RPIL

Used to define the keyword, which when entered as a response by a student who has gone to PIL from a CATALYST lesson will transfer control back to CATALYST. The student is returned to his point of departure from CATALYST.

EXAMPLE:

*RPIL = RETURN

After any asterisk in PIL, if the student types on the keyboard "RETURN" he will automatically be transferred back to his point of departure from CATALYST.

Once the student has returned, CATALYST will print the following on his terminal:

```
WHAT IS YOUR RESPONSE TO THE LAST QUESTION?
```

The LD's PIL data and the student's PIL data are partitioned and saved for multiple transfers to and from PIL until the end of the CATALYST lesson.

*TRACE

This verb causes a list of frame numbers encountered by a given student in a lesson to either be printed on the student's terminal or appended to a file specified by the LD when the lesson is terminated.

EXAMPLE:

```
*TRACE
```

will cause the list to be printed on the student's terminal.

```
*TRACE TO DSK:ABCDEF.101[777777,111111];
```

In this form, the list will be appended to the disk file "ABCDEF.101" and the project-programmer number of the owner of the file is "[777777,111111]". The file should be protected with the code <544> with the following monitor command:

```
.PROTECT ABCDEF.101 <544>
```

before students are given access to the lesson.

*TTY

The verb "TTY declares properties of the terminal on which the statement is executed.

EXAMPLE:

```
*TTY = PAGE, FORM, LC, NO ALTMODE
```

This will set the terminal characteristics to "PAGE, FORM, LC, NO ALTMODE" and keep the characteristics like that until changed by another *TTY command. The different options allowed are:

"ALTMODE" converts the Altmode codes of 175 and 176 to the ASCII standard escape character 033.

"NO ALTMODE" restores the individual identity of the codes 175 and 176 as characters in the ASCII character set.

"BLANKS" restores multiple carriage return-line feeds and form feeds.

"NO BLANKS" suppresses blank lines (consecutive carriage return-line feeds after the first) and outputs form feeds and vertical tabs as 2 carriage return-line feeds. This is used for the display terminal in order to prevent the output from moving up off the screen.

"CRLF" restores the "wraparound" carriage return normally inserted at the right margin to prevent loss of output.

"NO CRLF" The carriage return normally output at the end of a line exceeding the carriage width is suppressed.

"ECHO" restores the normal echoing of each character typed in.

"NO ECHO" The terminal line may have local copy and the computer should not echo characters typed in. This is also useful when teaching students about non-echoed passwords, etc.

"FILL n" The filler class n is assigned to this terminal to indicate the appropriate number of fill characters to be inserted for each line of output.

"NO FILL" This is equivalent to FILL 0.

"FORM" The terminal has hardware FORM (PAGE) and (VT) vertical tabs characters.

"NO FORM" The monitor sends eight line feeds for a FORM and four line feeds for a VT.

"GAG" The SEND command cannot be received at this terminal unless the terminal is at monitor level (initial state).

"NO GAG" The SEND command can be received at this terminal even though it is not at monitor level.

"LC" The translation of lower-case characters entered by the student to upper case is suppressed.

"NO LC" The monitor translates lower-case characters to upper case as they are received. In either case, the ECHO sent back by the monitor matches the case of the characters after translation. By looking at the printout, the lesson designer can determine what translation was performed by the monitor.
NOTE: LC and NO LC have no effect on text output by the lesson.

"PAGE" The student is given the ability to temporarily suspend system typeout without losing it. The XOFF key (control-S) suspends the typeout, and the XON key (control-Q) restores it. The XOFF and XON keys are not echoed and are not sent to the student's terminal. This statement is useful for display terminals where the student may want to read a page of text before it disappears from the screen. (Note that this preempts the use of control-S and control-Q for reading paper tape.)

"NO PAGE" The typeout control ability of the XOFF and XON keys is disabled.

"TAB" The terminal has pre-set hardware tabs stops and transmits TAB (control-I) characters directly to the terminal.

"NO TAB" monitor simulates TAB output for lessons by sending eight blanks whenever a TAB (control-I) character is detected in the lesson.

"TAPE" The XON key (control-Q) causes the terminal to read paper tape. The XOFF key (control-S) causes the terminal to stop reading paper tape.

"NO TAPE" The XON key (control-Q) and XOFF key (control-S) have no special paper tape function. (They may have a PAGE function, as described above.)

"WIDTH n" The carriage width (the point at which a "wraparound" carriage return may be inserted) is set to n. The range of n is 17 (two tab stops) to 200 decimal. This is useful when a terminal is known to have 72, 80, or 132-column capability and can be anticipated by the LD.

Question Mark Statements

These statements are used to examine the last response of the student, demand a response from the student, branch unconditionally, or branch conditionally. The following are the combinations of question mark commands, all of which start in column one:

?

One question mark will use the student's last-entered response for comparison against the LD's expected response(s).

??

Two question marks allow the student to enter a new response which is compared with the LD's expected response(s).

?+

The plus sign will generate a random "reinforcement comment" if the student's response agrees with one expected response. The student's name will be added 50% of the time if the asterisk command "*NAME" was used or if the variable NAME has a non-NULL value.

?-

The minus sign indicates that if the student's response does not agree with one expected response, the student's response(s) will first be displayed to him (with a few modifications), after which CATALYST drops thru to the next sequential line in the lesson file.

?+-

This permits the effect of both the plus sign and minus sign with a check of the student's last response.

??+

When a double question mark with a plus sign appears in column one, the lesson designer is demanding a response from the student and the student will receive a random reinforcement comment from CATALYST if he answers correctly.

??-

Again the LD is demanding an answer from the student but is anticipating an incorrect answer. If the student answers incorrectly he will receive his response displayed and CATALYST will go on to the next sequential statement.

??+-

This is a demand for a response from the student, positive reinforcement for a correct answer, and a way to handle the unexpected response.

The form of the question mark statement is:

mark verb arg; verb arg; verb arg; verb arg:expected responses

where "mark" may be any one of the ? combinations.

The verb can be any of the following:

APPEND
COUNT
ELAPSE
EXP
FRAME H
FRAME T
FRAME X
LATENCY
LINK
RETURN
STR
TIME
TYPE
UNLINK

The "arg" can be any valid argument for the particular verb. A valid argument for "TYPE" could be any number between 1 and 7, signifying the different modes of input. A valid argument for "COUNT" would be a number between 1 and 131071.

The "expected" responses" can be anything valid for the mode of the "TYPE" verb. These responses can be separated by commas, thus allowing multiple possible answers. Strings with embedded commas must be enclosed in double quotes (").

The "verb" and "arg" must be separated by a space. They must be separated from other pairs with semicolons (;) and the last pair must end with a colon (:) followed by any test strings (expected responses).

At least one "verb arg" pair must be used in a "?" statement.

APPEND

This verb is used to append the information listed after the semicolon (;) onto the end of the file specified by the LD.

EXAMPLE

```
?APPEND DSK:ABCDEF.101[777777,111111]; IN FORM "###    ", A,B
```

This will append the character variable A (3 characters or less) and the numeric variable B (less than or equal to 999) to the file "ABCDEF.101" on project-programmer number [777777,111111]. The information to be appended must be either PIL variables, constants, and/or alphanumeric strings enclosed in quotation marks. The first item in the list may optionally be the string "IN FORM m", where "m" is some predefined or literal PIL form (see PIL manual).

COUNT

The COUNT verb is used as a conditional branching tool which enables the LD to branch on the number of times a frame is executed. Each time a frame is encountered (and it has the count verb), the count parameter will be decreased by one; if it is still greater than "0" (zero), a branch to the specified frame will occur. If, after being decreased, the count is zero, the lesson drops thru to the next sequential line in the lesson file.

EXAMPLE:

```
?FRAME 5093; COUNT 21:
SORRY, THAT's NOT IT.
```

Each time encountered, the count parameter "21" (which could be any positive integer between 1 and 131071) will be decreased by one; if it is still greater than "0" (zero) a branch to frame "5093" will occur. If, after being decreased, the count is zero, the next sequential line is used (here, "SORRY, THAT'S NOT IT." will be printed on the terminal).

ELAPSE

This verb is used to transfer a particular frame once the time in a timed response is exhausted.

EXAMPLE

```
?? FRAME 21; TIME 30; ELAPSE 1256; TYPE 1: ALRIGHT
```

In this example the lesson designer is expecting the student to answer the question in "30" seconds (TIME 30). The student's response must be the string "ALRIGHT" and if the student types the correct answer ("ALRIGHT") the lesson will transfer the student to frame "21" (FRAME 21). If the student does not type the correct response in "30" seconds (TIME 30) and time runs out, the lesson will transfer the student to frame "1256" (ELAPSE 1256). The timer begins when the "??" is executed and terminates when the student hits a "carriage return" or when time is exhausted.

EXP

This verb interprets a student response as an arithmetic experession. The response is evaluated and stored in the PIL variable specified.

EXAMPLE:

```
??EXP ARITH:
```

The student must enter some arithmetic expression which will be evaluated and stored in the variable "ARITH". If the student entered "2*2" the answer to the evaluated expression "4" would be stored in the variable "ARITH". This is useful for checking a student's progress through a lesson or later use and playback by the LD. The variable "ARITH" is a PIL variable and may be used in calculations. The answer "2*2" is still available as any other response string.

FRAME H

This verb transfers back to the beginning of the frame from which the keyword on the last-encountered "*HELP=nn, keyword" was typed as a response by the student.

EXAMPLE:

```
*HELP=15,HELPME
*FRAME 1
??FRAME 5000; TYPE 1: HELLO
?FRAME 49; TYPE 1: BYE
.IF NAME $NE "", TO FRAME 5
*FRAME 15
PLEASE READ CHAPTER 23
?FRAME H:
```

In this example the student can type the keyword "HELPME" at any demand for a response and when he does he will receive the message to read chapter

23 ("PLEASE READ CHAPTER 23"). The reason that message will be typed to the student is that when the student types "HELPME" the LD has used FRAME 15 as the HELP frame ("*HELP = 15, HELPME"). In frame 15 when the statement "?FRAME H:" is encountered the student will be transferred back to frame 1 or 2 depending on where he typed "HELPME" in this small CATALYST lesson fragment.

FRAME T

This verb transfers back to the <u>beginning</u> of the frame from which the last timer elapse occured. In this way, the lesson designer may write one group of frames to handle all timer elapse conditions. Return to the frame in which the timer expired is thus automatic, giving the student another chance to answer the question in the allotted time period.

EXAMPLE:

```
*FRAME 1
??FRAME 12; TIME 30; TYPE 2; ELAPSE 22:  CAT
*FRAME 2
VERY GOOD
?FRAME 900:
*FRAME 22
TOO SLOW.  TRY AGAIN.
?FRAME T:
```

In this example if the student does not answer the question in 30 seconds (TIME 30") the student will be transferred to frame 22 ("ELAPSE 22"). The lesson designer may at FRAME 22 reinforce some particular knowledge like the spelling of "CAT" which was the correct response for the demand of an answer. Then the LD may use the statement "?FRAME T" which would transfer the student back to the frame where he didn't answer the question in the allocated time.

FRAME X

This verb is a general-purpose "FRAME H" or "FRAME T". The verb will cause a branch to the frame specified in the last-encountered "RETURN" statement.

EXAMPLE:

```
*FRAME 1
??FRAME 90; RETURN 1295; TYPE 7:  1+2
*FRAME 2
VERY GOOD
?FRAME 100:
*FRAME 90
NO, 1+2 IS NOT CORRECT
?FRAME X:
```

With this example, when frame 90 is executed, the "FRAME X" will transfer the student to frame "1295" (RETURN 1295).

LATENCY

This verb allows timings to be made on a student's progress through a lesson. There are two args for the verb, ON and OFF.

```
     ??FRAME 109;LATENCY ON; TYPE 1: CAT
```

"LATENCY ON" causes the equivalent to the following PIL statement to be executed:

```
     .SET LATENCY = THE TIME
```

The PIL variable "LATENCY" will now have the current time of day (in 300's of a second relative to 12:00 midnight). The second arg form is:

```
     ??FRAME 9995; LATENCY OFF; TYPE 7:1+2
```

This will have the effect of giving a result in the PIL variable "LATENCY" of the time difference between "LATENCY ON" and "LATENCY OFF". To prevent an undefined variable condition from arising due to the LD neglecting to do a "LATENCY ON" prior to a "LATENCY OFF", a "LATENCY ON" is simulated at run time by CATALYST. Since the PIL variable "LATENCY" is available to the lesson designer, he may do sophisticated time study analysis on the learning progress of a student.

LINK

The LINK verb is used in calling CATALYST sublessons. If an LD wishes to create CATALYST modules which can then be used by many different CATALYST lessons, the LINK verb allows this. When a lesson is called using the LINK verb all non-PIL data concerning the current lesson is saved. Then CATALYST begins execution of the lesson specified with the LINK verb.

EXAMPLE

```
*FRAME 30
??FRAME 22; TYPE 1: NO, N, NO I DO NOT, NOT, I DON'T, I DON'T
?FRAME 13; TYPE 1: YES, Y, YES I DO, I DO
?FRAME 9876:
*FRAME 13
;THIS FRAME WILL GO TO ANOTHER CATALYST LESSON.
;THE STUDENT HAS ANSWERED THAT HE WISHES TO
;GO ON TO ANOTHER LESSON.  THIS COULD BE IN ANOTHER
;SUBJECT, ETC.
?LINK DSK:ANOTHR.1[111111,222222];:
;AT THIS POINT CATALYST WILL TRANSFER CONTROL
;TO THE LESSON "ANOTHR.1[111111,222222]"
```

NOTE: Frame numbers, HELP values, etc., are part of the "non-PIL" data; therefore, a lesson and a sublesson may both have a *FRAME 1, For example, the last response entered by the student is PIL data and may be shared by the lesson and sublesson.

RETURN

RETURN specifies which frame to branch to when the next "FRAME X" is executed. This is useful when one has a section of the lesson which may be utilized many times but from different parts of the lesson (see "FRAME X") and is a more general usage than that for HELP and ELAPSE.

STR

The verb STR is similar to EXP, the difference being STR stores a string for later use and/or playback.

EXAMPLE:

```
??STR STRING:
```

CATALYST will wait for the student to type a response. The variable "STRING" will contain a copy of the student's response.

TIME

This verb is used to set a time limit in seconds, as to how long CATALYST will wait for a response from the student. The time is given as an arg for the TIME verb in seconds. The maximum time allowed is 3600 seconds (1 hour).

NOTE: This use will not override any monitor timer limit set by the system for the student's response before detaching the student's job.

EXAMPLE:

```
*FRAME 60
??FRAME 30; TYPE 1; TIME 20:THE SQRT OF 4,4,SQRT(4)
?FRAME 99:
*FRAME 30
YOU HAVE ANSWERED CORRECTLY AND IN THE ALLOTTED TIME.
```

In this example the student has 20 seconds (TIME 20) to answer the question. If the student answers the question correctly he will transfer to FRAME 30 and a message will be printed that he did well.

TYPE

The verb TYPE handles all the input in CATALYST. It will check the student's response against the expected response(s). There are seven forms of the TYPE verb:

TYPE 1

TYPE 1 looks for a response that agrees exactly with one of the expected responses (test strings). The student's answer must match character for character with any of the strings the LD has following the colon (:).

EXAMPLE:

```
??TYPE 1:  YES, YEP, YEAH
```

The student's response must exactly match one of the expected responses.

TYPE 2

This form of TYPE will look for any substring in the student's answer to match one expected response that the LD has as a test string. Looks for a substring in the student's total response string to match one test string.

EXAMPLE:

```
??TYPE 2:  YES, YEP, YEAH
```

The student's response must contain one of the expected responses. The lesson will accept responses such as "YES, INDEED" and YEAH VERILY". "YESTERDAY" is also accepted because "YES" is embedded in the word.

TYPE 3

TYPE 3 looks for several substrings, all of which must be present in the student's response. The order of the substrings is irrelevent.

EXAMPLE:

```
??TYPE 3:  CAN, I, YES
```

Will accept "YES, I CAN" and "I CANNOT SAY YES" as well.

TYPE 4

The format of TYPE 4 is the same as TYPE 3 except the order of the keywords must be the same as the expected response(s) (test strings).

EXAMPLE:

??TYPE 4: CAN, I, YES

Will reject "YES, I CAN", and "I CANNOT SAY YES", but will accept "CAN IT BE YESTERDAY".

TYPE 5

TYPE 5 looks for an equivalent numeric algebraic form. The following responses for an expected response of "10" would be valid: "2*5", "1*10", "5+5", etc.

TYPE 6

This TYPE looks for the student's response to match an expected response, but forces compare of student's response to begin in column 1 of the input.

EXAMPLE:

??TYPE 6: YES, YEP

Will accept either "YES" or "YEP" if the "Y" is in column 1 of the student response.

TYPE 7

TYPE 7 is the same as TYPE 1 except that the student may embed blanks throughout the answer.

EXAMPLE:

??TYPE 7: YES, YEP, YOUBETCHA

Will accept "YES" or "YOU BETCHA" but not "YEP!"

UNLINK

UNLINK returns control to the statement in the calling lesson (main lesson) following the LINK. The main lesson and the sublesson will be two different lesson files.

EXAMPLE:

```
;MAIN LESSON
*FRAME 1
??FRAME 2, TYPE 1: NO
?FRAME 3, TYPE 1: YES
?FRAME 5:
*FRAME 2
YES THE ANSWER TO THE QUESTION IS "NO".
*END
*FRAME 3
?LINK DSK:REPEAT.1[333333,444444];:
?FRAME 1:
*END

;SUBLESSON REPEAT.1
*FRAME 1
;CHECKS LAST RESPONSE FROM MAIN LESSON
?FRAME 2; TYPE 6:YES
?FRAME 3; TYPE 6:NO
*END
*FRAME 2
;THE STUDY GUIDE FOR THAT AREA IS INSERTED HERE
?UNLINK:
*END
*FRAME 3
?UNLINK:
*END
```

RESPONSE

The verb "RESPONSE" is used as a means to analyze the student's response. The form is "RESPONSE=keyword" or "RESPONSE=PIL if clause".

EXAMPLE:

??FRAME 2; TYPE 5: 0 <RESPONSE <10

In this example any answer which is greater than 0 (RESPONSE >0) and less than 10 (RESPONSE <10) will cause a transfer to frame 2 (FRAME 2).

DIRECT PIL STATEMENTS (.Statements)

The DIRECT MODE statement allows the lesson designer/student to evaluate arithmetic expressions, determine the value of transcendental functions, and store results for later use. Statements in the desk calculator mode result in an immediate response by PIL. After execution of a direct mode statement, the statement is not retained, but any variables defined by it are retained. For more information on PIL and/or DIRECT MODE statements see the PIL manual available at the University of Pittsburgh Bookstore.

There is one unique Direct Mode PIL statement not mentioned in the PIL manual since it was developed for the CATALYST lesson designer only. The statement is:

.to FRAME arg

where "arg" is any defined number in the CATALYST lesson the LD/student is executing. This command will force the normal sequential operation of CATALYST to the frame number used as the argument of the ".TO FRAME ". Note that ".TO FRAME 5" is equivalent to "?FRAME 5:", but its use is more common to PIL IF statements, such as '.IF THE USER="[33,13507]", to FRAME 5', where any legal PIL IF may be used.

For special procedures, the PIL LOAD, EXECUTE, RUN, DO PART, and DO STEP statements are also legal.

EXAMPLE:

```
.LOAD "MYFILE.PIL[33,347]"
.DO PART 1
*FRAME 2
??FRAME 3: CONTINUE
*END
*FRAME 3
.RUN "PROG7.EXE[33,553]"
*END
```

Where MYFILE.PIL[33,347]might contain:

```
1.1 TYPE "HI, THERE"
1.2 ASSIGN "STAT.FIL[33,347]" AS "OUT"
1.3 APPEND ONTO "OUT", IN FREE FORM, THE USER, BCD DATE, BCD TIME
1.4 DELETE ASSIGNMENT "OUT"
1.5 DONE
```

and where "PROG7.EXE[33,353]" might be a special-purpose FORTRAN program for the student's use which has been compiled, loaded and stored in EXEcute form.

Final Note on Expected Responses

Expected responses found in "?" statements may be of either of two types: quoted and unquoted.

Unquoted expected responses are treated as character strings terminated by commas in the "?" statements (the comma is not considered part of the string.

EXAMPLE:

?TYPE 1: JOHN JONES, J. JONES

Here the expected responses are "JOHN JONES" and "J. Jones". The blanks following the colon and the comma are ignored by CATALYST, but the blanks following JOHN and J. are retained and *are* required to be present in the student's response.

Where leading and trailing blanks and commas are desired as part of expected responses, the quoted type may be used. Quoted expected responses are enclosed by double quotes (").

EXAMPLES:

?TYPE 1: "JONES, JOHN", "JONES, J."

?TYPE 4: "JONES,", " JOHN"

In the TYPE 1 example, the commas following JONES must appear in the student's response. In the TYPE 4 example, the comma must follow JONES, and the blank preceding JOHN must be present (this allows any number of blanks to appear between "JONES," and "JOHN", as long as one blank immediately precedes "JOHN").

Note that the commas separating the expected responses must be used as shown.

Finally, quoted and unquoted strings may be used in the same "?" statement.

EXAMPLE:

?TYPE 4: "JONES,", JOHN

Where the comma following "JONES" is required, but, since "JOHN" is unquoted, the student could respond JONES,JOHN (without spaces) and be correct, since leading blanks in unquoted strings are ignored.

Anytime the LD needs to test the presence of a blank, as in a TYPE 4 expected response, "" may be used to test for the presence of one blank (use more blanks as required, but the match must be exact). Also, since PIL defines "" as the NULL string (that is, a string containing no characters), the following statement:

```
?TYPE 1: ""
```

will properly test for a student's response which contains nothing more than a carriage return, as in the following fragment:

```
*FRAME 5
WHEN READY, HIT RETURN
??FRAME 10; TYPE 1: ""
JUST HIT THE RETURN KEY WHEN YOU WISH TO CONTINUE
?FRAME 5:
*FRAME 10
   (rest of lesson)
```

The present implementation of CATALYST ignores character case (upper or lower) when comparing student responses to expected responses. Both the student response and expected response are compared as though they were both in upper case. FORTRAN versions of TRAINER's CATALYST modules behave in the same way.

Appendix 4

Documentation for CATRAN Users

This tape contains the CATALYST to FORTRAN translator (CATRAN) and the STI training modules. All files are in ASCII with lines terminated with a <CR><LF> pair. The programs are written primarily for DEC PDP 11 users but may be modified to run on other systems using FORTRAN. The following is a list of the files on this tape.

read.me - General instruction file.
ratfor.for - RATFOR to FORTRAN translator in FORTRAN.
catran.for - CATALYST to FORTRAN translator in FORTRAN.
catsub.for - Runtime support for FORTRAN output of CATRAN in FORTRAN.
catran.rat - CATALYST to FORTRAN translator in RATFOR.
catran.inc - Definition of COMMON areas for CATRAN.RAT.
catsub.rat - Runtime support for FORTRAN output of CATRAN in FORTRAN.
catran.c - Original version of CATALYST to FORTRAN translator in C.
ratfor.com - Command file for using RATFOR under VAX-11/780 VMS.
catran.com - Command file for using CATRAN under VAX-11/780 VMS.
compil.com - Command file to compile all supplied FORTRAN under VMS.
build.com - VMS command file to rebuild programs from sources.
sti001.for - FORTRAN output of CATRAN for STI module 001.
sti100.for - FORTRAN output of CATRAN for STI module 100.
sti200.for - FORTRAN output of CATRAN for STI module 200.
sti300.for - FORTRAN output of CATRAN for STI module 300.
sti400.for - FORTRAN output of CATRAN for STI module 400.
sti500.for - FORTRAN output of CATRAN for STI module 500.
sti600.for - FORTRAN output of CATRAN for STI module 600.
sti700.for - FORTRAN output of CATRAN for STI module 700.
sticon.for - FORTRAN output of CATRAN for STI module con.
stidia.for - FORTRAN output of CATRAN for STI module dia.
stiorb.for - FORTRAN output of CATRAN for STI module orb.
sti001.cat - Original CATALYST version of STI module 001.
sti100.cat - Original CATALYST version of STI module 100.
sti200.cat - Original CATALYST version of STI module 200.
sti300.cat - Original CATALYST version of STI module 300.
sti400.cat - Original CATALYST version of STI module 400.
sti500.cat - Original CATALYST version of STI module 500.
sti600.cat - Original CATALYST version of STI module 600.
sti700.cat - Original CATALYST version of STI module 700.
sticon.cat - Original CATALYST version of STI module con.
stidia.cat - Original CATALYST version of STI module dia.
stiorb.cat - Original CATALYST version of STI module orb.

Users who want to use the training modules with no changes should compile catsub.for and the FORTRAN versions of the modules. The object for each module should then be linked with catsub. Under VAX VMS this is all done with the file compil.com. Under RT-11 the sequence would be -

```
 .R FORTRA
 *catsub=catsub
 *sti001=sti001
 *sti100*sti100
   .
   .
   .
 .R LINK
 *sti001=sti001,catsub/f
 *sti100=sti100,catsub/f
   .
   .
   .
```

Depending on your operating system some modifications may be required in the catsub routines. Catsub contains most of the machine/operating system dependencies. No attempt has been made to supply running versions of the timing routines or other extremely system dependent functions. For most purposes they are not needed anyway. It may also be necessary to change the FORTRAN I/O unit numbers for TTYIN and TTYOUT. They are defined in a DATA statement near the top of the FORTRAN version of each module as 5 and 6.

Users who have to make modifications to the training modules will have to generate the CATRAN and RATFOR translators. The build.com command file shows how to do this for VAX VMS. Be sure to look through the sources for both of the programs first since certain places are marked for inclusion with various operating systems.

Also included on the tape is catran.c. This is the original version of the CATALYST to RATFOR translator. It was written in C because of the effeciency of C and the speed with which code could be written and tested. In order to understand how the CATRAN translator works this is the version to look at. The RATFOR version was generated from the C version partly by another program and partly by manual editing. The final FORTRAN version is the machine translation of the RATFOR version produced by the RATFOR translator. More information on RATFOR is available in the book "Software Tools" by Kernighan and Plaugner from Addison-Wesley (1976). This RATFOR version is from the tape of the programs in the book available for $15.00 from Addison-Wesley.

General operation of CATRAN

CATRAN is a program for translating working CATALYST programs from the systems at the University of Pittsburgh into portable FORTRAN. No attempt has been made to do syntax checking - the assumption is made that the input program is correct. Additionally no attempt has been made to include all of the features of PIL which are available through the PITT implimentation of CATALYST. In order to make up for the lack of PIL statements a ".lit" statement has been added which allows generation of arbitrary FORTRAN statements in the output. (See the "CATALYST Users Guide" and the "CATALYST Reference Card" from the PITT computer center for a complete description of CATALYST.)

The basic idea of CATRAN is to examine a CATALYST program and generate a sequence of FORTRAN statements to carry out the same task. In order to accomplish this, a group of subroutines in catsub.rat has been written which handles some of the primary CATALYST operations. The FORTRAN output of all CATALYST programs also includes a standard prefix of about 45 statements to handle initializations, condition traps, standard messages etc. This header is listed below.

```
      IMPLICIT INTEGER (A-Z)
      LOGICAL TRACE,VMATCH,TMATCH
      INTEGER UNAME(20),RESPON(132),HELPT(132)
      INTEGER PROMPT,HELPS,CNTS(40),CIDS(40)
      INTEGER FRAMC,FRAMX,FRAMH,FRAMT
      INTEGER TIMRET,TIMINT,TTYIN,TTYOUT
      DATA MENTRY,TRACE,HELPS,TTYOUT,TTYIN/0,0,0,6,5/
      DATA PROMPT/'>'/
27000 FORMAT(' Entering Frame ',I5)
      DO 27001 I=1,40
      CIDS(I)=0
27001 CNTS(I)=0
      LTIME=TIME(0)
27002 FORMAT('+',A1,$)
27003 FORMAT(132 A1)
      GO TO 27017
27004 FRAMT=FRAMC
      GO TO TIMRET
27005 WRITE(TTYOUT,27006)
27006 FORMAT('0No frame has yet been set to handle a timer',
     *' elapse condition.')
      CALL CEXIT(UNAME)
27007 WRITE(TTYOUT,27008)
27008 FORMAT('0No frame has yet been set for a return from a',
     *' HELP condition.')
      CALL CEXIT(UNAME)
27009 WRITE(TTYOUT,27010)
27010 FORMAT('0No frame has been set for return from a timer')
      CALL CEXIT(UNAME)
27011 WRITE(TTYOUT,27012)
27012 FORMAT('0No RETURN frame has yet been set  for use by',
     *' the FRAME X verb.')
      CALL CEXIT(UNAME)
27013 WRITE(TTYOUT,27014)
27014 FORMAT('0No frame has  yet been entered')
      CALL CEXIT(UNAME)
27015 WRITE(TTYOUT,27016)
27016 FORMAT(' *** UNDEFINED FRAME TRAP ***')
      CALL CEXIT(UNAME)
27017 ASSIGN 27004 TO TIMINT
      ASSIGN 27005 TO TIMRET
      ASSIGN 27007 TO FRAMH
      ASSIGN 27007 TO HELPS
      ASSIGN 27009 TO FRAMT
      ASSIGN 27011 TO FRAMX
      ASSIGN 27013 TO FRAMC
27018 FORMAT(' Please enter your first name or nick-name.>'$)
27019 FORMAT(' ')
```

The implimentation of features using assigned variables makes the assumption that the address of the assigned location is placed in the variable.

Since most CATALYST programs are largely composed of blocks of text, a major fucntion of CATRAN is to translate text into writes and formats which will regenerate the same text. This function is illustrated below in the CATRAN version of this paragraph.

```
27020   FORMAT('      Since most CATALYST programs are largely comp',
      1'osed of  blocks'/' of  text,  a  major  fucntion of CATRAN is',
      2' to translate text into'/' writes and formats which will  reg',
      3'enerate  the  same  text.  This'/' function is illustrated be',
      4'low in the CATRAN version of this para-'/' graph.')
        WRITE(TTYOUT,27020)
```

Due to the fact that CATALYST statements can usually be recognized by simply looking at the first few characters of a line, the function getlin in addition to reading input classifies the input lines. Getlin returns a single value which indicates the type of CATALYST statement read. The returned value of getlin is used as a switch through the group of cases in the main progran body. For each case an appropriate block of FORTRAN code is generated. During code generation, statement numbers are created as needed beginning at 27020. The output for CATALYST frame statements gets the statement number assigned to the frame. Notice that with the exception of text, a comment echoing the input is also output.

Question mark commands from CATALYST are treated separately in the routine called quest. In this case the various possible components of a question mark command are searched for in code generation order. Appropriate code is output for each match. It is instructive to just run the translator with both input and output assigned to a terminal. In this way you can see exactly what is generated as you type in statements. You may also want to look through the supplied FORTRAN versions of the trainers to see how code is generated.

On some operating systems a number of compilation warnings will be generated when catran.for is compiled. These are due to variable and function names which are longer than 6 characters. This does not cause a problem however since they are all unique within 6 characters. If any significant changes are needed I suggest that they be made in the RATFOR version rather than trying to modify the FORTRAN directly. The nature of the machine generated FORTRAN is such that it is easy to misunderstand.

I hope it will be a simple matter for you to get all of this working. If not, feel free to call me at the university.

Good Luck

Art Wetzel
711 LIS Bldg
University of Pittsburgh
Pgh, Pa 15260

412-624-5208

Appendix 5

Load and Deposit Byte Subroutines for Emulator Implementation

Load Byte and Deposit Byte

Documentation of the LDB and DPB functions which follow is taken from DEC-10 documents issued by the University of Pittsburgh (LDB,DPB), and from a program listing of a revised version used by TRAINER.

These routines are provided for the convenience of DEC-10 users; systems which have byte addressable capabilities will not need them

LDB

LDB (LoaD Byte) is an integer function that extracts a byte of any length from any position in a word. By defining a byte to be 7 bits, LDB can be used to manipulate ASCII characters, which are each seven bits long.

Calling Sequence:

```
LDB (startingbit, bytelength, word)
```

"Startingbit" is an integer from 0 (left-most bit) through 35 (right-most bit); "bytelength" is an integer from 1 through 36; and "word" is any variable or constant.

LDB extracts a byte of "bytelength" bits from "word", beginning with the "startingbit". The function returns an integer result containing those bits, right justified, padded on the left with zeros. The contents of "word" is unchanged.

Example:

```
I=LDB(14,7,J)
```

Seven bits, beginning with bit 14, are moved from J into I, right justified and padded on the left with zeros. J is unchanged.

DPB

DPB (DePosit Byte) is a subroutine that deposits a byte of any length into any position in a word. By defining a byte to be 7 bits, DPB can be used to manipulate ASCII characters, which are each seven bits long.

Calling Sequence:

```
CALL DPB (startingbit, bytelength, result, word)
```

"Startingbit" is an integer from 0 (left-most bit) through 35 (right-most bit); "bytelength" is an integer from 1 through 36; "result" is any variable; and "word" is any variable or constant.

DPB extracts a byte of "bytelength" bits from the right-most end of "word". These bits are placed into "result", beginning with the specified "startingbit". All other bits in "result" remain unchanged. The contents of "word" is unchanged.

By specifying a call to LDB as the fourth argument of a call to DPB, bits can be moved from any position in one word to any position in the same or another word.

Examples:

```
CALL DPB(12,4,I,J)
```

The right-most four bits of J are moved into I, beginning with bit 12. Hence, bits 12 through 15 of I will be set the same as bits 32 through 35 of J, and bits 0 through 11 and 16 through 35 of I will be the same as they previously were. J is unchanged.

```
DATA J/'QRSTU'/
CALL DPB(7,14,J,LDB(0,14,'ABCDE'))
```

Fourteen bits, beginning with bit 0, are moved from the literal constant 'ABCDE' into J, beginning with bit 7. All other bits of J will be the same as they previously were. Hence, J will contain the string 'QABTU'.

```
.TYPE BYTE \ \.MAC
        TITLE   BYTE - Simulate LDB & DPB from high-level language
        SUBTTL  Version 1.0, 31Oct78, RK Nicholas
;
        COMMENT "FORTRAN-10 calls are:
                                result=LDB(startbit, length, word)
                and
                                CALL DPB(startbit, length, result, word)
                where:
                startbit is the absolute value of the bit position
                  (0-35, decimal) of the starting bit of the byte;
                length is the absolute decimal number of bits in the
                  byte;
                word is the address of the donor word containing the
                  byte;
                result is the address of the word which receives the
                  byte extracted from word.

                In LDB, the byte is extracted from bits startbit thru
                startbit+length-1 of word and returned in the
                rightmost length bits of accumulator 0 (In FORTRAN,
                as the value of the function LDB).
                In DPB, the rightmost length bits are extracted from
                word and placed into bits startbit thru
                startbit+length-1 bits of result.  The remaining bits
                in result are unchanged.
                In FORTRAN, startbit, length, and word may be constants,
                variables, or expressions, but result must be a
                variable.
                In FORTRAN, LDB is an INTEGER function; DPB is a
                subroutine.
                A call to LDB may be used for word in a DPB call."
```

Use of LDB and DPB

```
        PAGE
        ENTRY   LDB, DPB

        SIXBIT  /LDB/
LDB:    SETZM   FLAG            ; 0 = LDB
        JRST    .+3

        SIXBIT  /DPB/
DPB:    SETOM   FLAG            ; -1 = DPB

        SETZM   ERROR           ;CLEAR ERROR COUNT
        HLRE    -1(16)          ;GET # ARGS
        ADDI    0,3
        JUMPG   0,ERR1          ;NEED AT LEAST 3
        SKIPE   FLAG
        JUMPE   0,ERR1          ;NEED 4 FOR DPB

        MOVM    0,@0(16)        ;GET START BIT
        CAILE   0,↑D35
        JRST    ERR2            ;IF > BIT 35
        MOVM    1,@1(16)        ;GET BYTE LENGTH
        CAILE   1,↑D36
        JRST    ERR3            ;IF > 36 BITS LONG
        JUMPE   1,DONE          ;IF 0 BITS, DONE
        ADD     0,1             ;COMPUTE...
        SOS     0               ;...RIGHTMOST BIT OF BYTE
        CAILE   0,↑D36
        JRST    ERR4            ;IF BYTE TOO LONG OR EXTENDS TOO FAR
        SUBI    0,↑D35          ;GET # BITS TO RIGHT OF RIGHTMOST BIT
        MOVMS   0
        LSH     0,6             ;MAKE ROOM FOR LENGTH
        ADD     0,1             ;ADD IN LENGTH
        LSH     0,↑D24          ;PUT IN BITS 0-11
        HRRI    0,@2(16)        ;GET ADR OF WORD (LDB) OR RESULT (DPB)
        SKIPL   FLAG
        JRST    .+4
                                ;HERE FOR DPB
        MOVE    1,@3(16)        ;GET BYTE FROM WORD
        DPB     1,0             ;PUT IN RESULT
DONE:   POPJ    17,             ;RETURN

                                ;HERE FOR LDB
        LDB     1,0             ;GET BYTE FROM WORD
        EXCH    1,0             ;PUT BYTE IN AC0
        SETZ    1,              ;CLEAR AC1 FOR TIDINESS
        POPJ    17,             ;RETURN
```

Program Listing LDB, DFB

```
ERR4:   AOS     ERROR
ERR3:   AOS     ERROR
ERR2:   AOS     ERROR
ERR1:   AOS     ERROR

        OUTSTR  HEAD1                   ;OUTPUT ERROR HEADER
        MOVE    1,FLAG
        OUTSTR  SUBR(1)                 ;OUTPUT SUBR NAME
        OUTSTR  HEAD2
        MOVE    1,ERROR
        IMULI   1,4                     ;POINT TO PROPER MESSAGE
        SUBI    1,3
        OUTSTR  ERROR(1)                ;OUTPUT MESSAGE
        OUTSTR  TAIL                    ;FINISH UP
        POPJ    17,                     ;RETURN

FLAG:   0
ERROR:  0
        ASCIZ   "NOT ENOUGH ARGS "
        ASCIZ   "START BIT TOO BIG"
        ASCIZ   "BYTE TOO LONG    "
        ASCIZ   "BYTE OVERFLOW    "
HEAD1:  ASCIZ   "
%WARNING ("
HEAD2:  ASCIZ   ") "
        ASCIZ   "DPB"
SUBR:   ASCIZ   "LDB"
TAIL:   ASCIZ   "
"

        END
```

Program Listing LDB, DPB

Appendix 6

PIRETS

is online but not interactive in the same sense that DIALOG™ and ORBIT™ are, with continuous feedback.

PIRETS allows "cyclic" searches: a "hit" file may be saved for immediate re-searching.

```
.SET TTY SYS A
 PITT DEC-1077/A 57A,01 15:28:03 TTY65


.LOGIN
 JOB 11 PITT DEC-1077/A 57A,01 TTY65
 #134701,026226
 PASSWORD:
 7,6 UNITS REMAINING   LAST LOGIN: 1329 31-DEC-74
 1528    02-JAN-75       THUR

 SYSTEM A DOWN 0000-0300 TUES, 1-7-75 FOR REGULAR SOFTWARE DEVELOPMENT,

 ,,NO PIRETS MESSAGES NOW,,,

            PIRETS WILL PROCEED BY QUERYING YOU TO DETERMINE
         DETAILS CONCERNING YOUR SEARCH,  MOST QUESTIONS WILL REQUEST
         'YES' OR 'NO' RESPONSES,  SOME GIVE A SET OF ALLOWED RESPONSES,
         IN GENERAL, 'HELP' MAY BE GIVEN AS A RESPONSE TO ANY QUERY BY
         PIRETS TO OBTAIN FURTHER CLARIFICATION,  ALSO 'EXIT' MAY BE
         GIVEN AS THE RESPONSE TO ANY QUERY TO TERMINATE THE PROGRAM,



 DISK BLOCKS USED:      25
 MAXIMUM ALLOWED:      100

 BATCH REQUESTS IN QUEUE:

         02306
         02307

 SDI REQUESTS IN QUEUE:

         NONE

 STORED PROFILES:

         NONE

 DO YOU WISH TO SEARCH NOW?
  => YES

 INTERACTIVE SEARCH MODULE  12-17-1974
```

```
DO YOU WANT THE SHORT OR THE LONG FORM OF PIRETS MESSAGES?
PLEASE RESPOND 'SHORT' OR 'LONG'
  => LONG


DO YOU WISH CURRENT AWARENESS SEARCH OR RETRO SEARCH?
RESPOND 'CA'  OR  'RETRO'
  => CA


DO YOU WISH CA-INTERACTIVE MODE OR CA-BATCH MODE OR SDI-BATCH MODE?
RESPOND 'INTER' 'BATCH' OR 'SDI'
  => INTER


SELECT YOUR DATA BASE AND FILE PLEASE.


.....ISI  => NO
.....ERIC  => YES
........CIJE  => NO
........RIE  => YES
................74-NOV  => YES


DO YOU WANT TO SEARCH USING A PROFILE WHICH YOU HAVE STORED?
  => NO


BEGIN YOUR PROFILE.
PLEASE ENTER SEARCH TERM(S), SPECIFYING LEVELS IF DESIRED.


          => MATH*


ENTER ALTERNATE TERMS, VARIATIONS, SYNONYMS, OR 'DONE'.


          => DONE


YOU MAY NOW DO ANY OF THE FOLLOWING:


   RESPOND 'AND' OR 'BUT-NOT'   TO EXTEND THIS STRATEGY
   RESPOND 'ANOTHER'    TO ADD AN ALTERNATE STRATEGY TO YOUR PROFILE
   RESPOND 'END'        TO TERMINATE YOUR PROFILE AND SUBMIT FOR SEARCH
  => AND
```

```
PLEASE ENTER SEARCH TERM(S), SPECIFYING LEVELS IF DESIRED.

          => ELEMENTARY

ENTER ALTERNATE TERMS, VARIATIONS, SYNONYMS, OR 'DONE'.

          => DONE

YOU MAY NOW DO ANY OF THE FOLLOWING:

   RESPOND 'AND' OR 'BUT-NOT'   TO EXTEND THIS STRATEGY
   RESPOND 'ANOTHER'    TO ADD AN ALTERNATE STRATEGY TO YOUR PROFILE
   RESPOND 'END'        TO TERMINATE YOUR PROFILE AND SUBMIT FOR SEARCH
  => END

CHECK PROFILE?  => YES



-----  SEARCH SPECIFICATION  -----

FILE SEARCHED: ERIC RIE  74-NOV  ON: JAN. 2, 1975   AT: 15:31:02


SEARCH PROFILE:

ANY ONE OF:

     MATH*

AND ONE OF:

     ELEMENTARY


PROFILE OK?  => YES
```

```
--------  SEARCH SUMMARY  --------

NUMBER OF DOCUMENTS:          1,154
TOTAL HITS FOR SEARCH:           32


TIME          0 MINS.    11.93 SECS.



WANT TO EXAMINE SOME HITS NOW?
  => YES


DO YOU WANT ALL OR JUST SOME OF THE ABOVE HITS?
RESPOND  'ALL'  OR  'SOME'
  => SOME


TYPE HIT NUMBERS AS FOLLOWS:

FOR SPECIFIC HITS:
     '9,32,19' - MEANING HITS 9, 32, AND 19
FOR A RANGE OF HITS:
     '12-21' - MEANING HITS 12 THROUGH 21
FOR EVERY 'N-TH' HIT:
     *5 - MEANING EVERY 5-TH HIT - 5-10-15-20-ETC.

THEN TYPE 'DONE' AFTER LISTING ALL HIT NUMBERS.


  => 10,DONE




 ------------------------
DOCUMENT: ED 094983

SEQ.:      ED094983 SE017523

TITLE:     MATHEMATICS FOR THE ELEMENTARY SCHOOL, UNIT 2, SETS.

AUTHOR:    POWELL, BONNIE, ED. AND OTHERS

SOURCE:    MINNESOTA UNIV, MINNEAPOLIS. MINNESOTA SCHOOL
           MATHEMATICS AND SCIENCE CENTER.

KEY-WDS:   DESCRIPTORS- ACTIVITY LEARNING; *CURRICULUM; <*ELEMENTARY>
           SCHOOL <MATHEMATICS;> INSTRUCTION; *INSTRUCTIONAL
           MATERIALS; NUMBER CONCEPTS; *SET THEORY; *TEACHING
           GUIDES; UNITS OF STUDY (SUBJECT FIELDS) WORKSHEETS
           -IDENTIFIERS- MINNEMAST; *MINNESOTA MATHEMATICS AND
           SCIENCE TEACHING PROJECT
```

4